MARCH 19, 1951

STEEL

The Weekly Magazine of Metalworking

OF MICHIGAN
R 1 1951
ENGINEERING

Clinics Open Doors for Subcontractors

—page 41

Stampers Pressed by Government Curbs, Shortages, p. 37
Frozen Mercury Patterns for Precision Casting, p. 66
105-mm Rifle Joins Recoilless Family, p. 73

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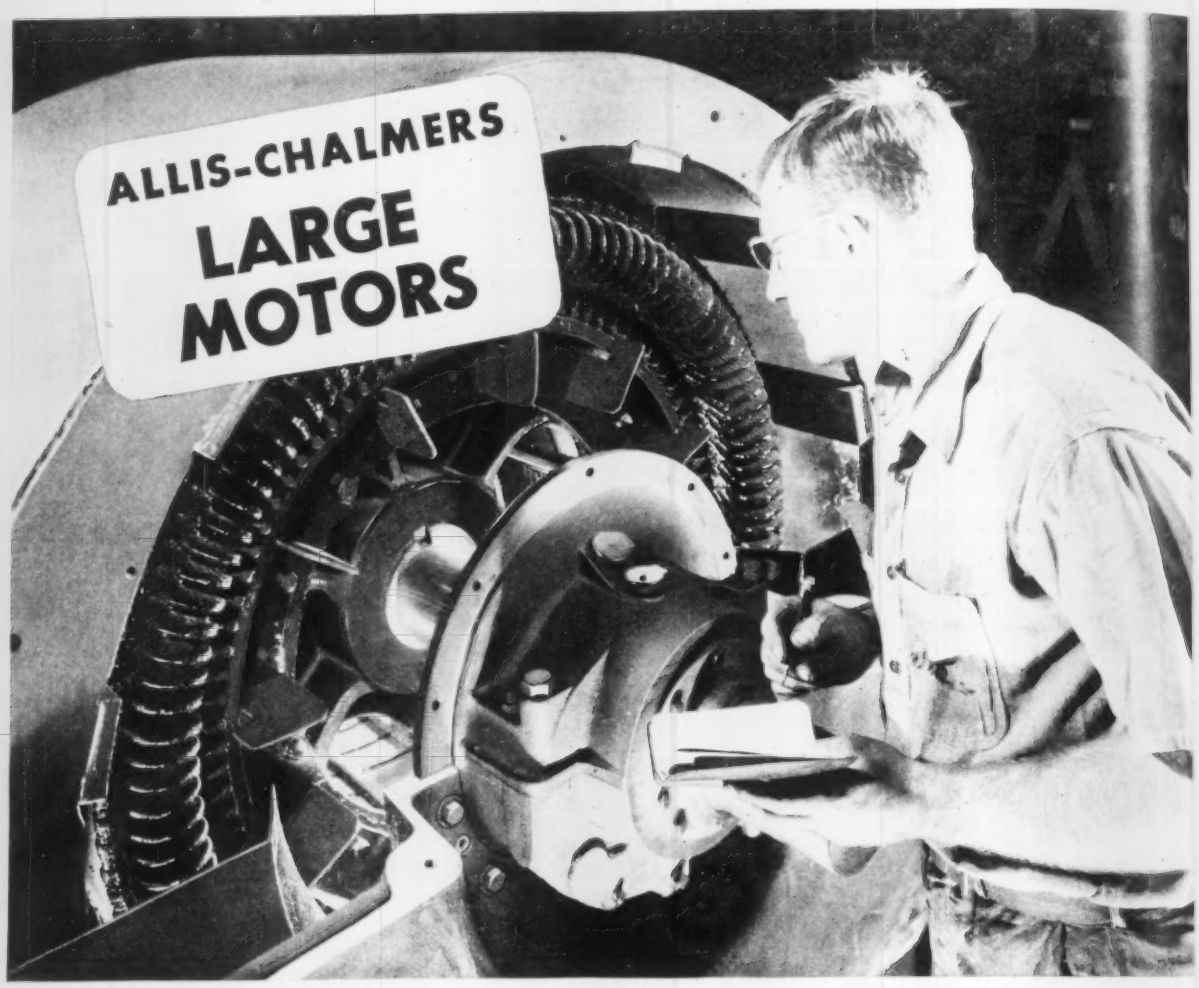
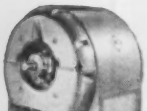


HOW'S THIS FOR Accessibility?



ONE MAN can perform all routine maintenance jobs on this brand new line of Allis-Chalmers large motors. He can remove the upper halves of the end brackets and air baffles and reach right inside the motor with his vacuum cleaner or air hose. There is plenty of room to reach up back of the stator core through air discharge openings in the stator yoke.

Bearings Protected

The capsule-type sleeve bearings need not be opened up and exposed when the end bracket halves are removed. The bearings are protected from abrasive dust and dirt while the motor is being cleaned. This eliminates the work usually required to dismantle the bearing, clean and reassemble it during routine maintenance.

Easy Installation

Large stator air discharge openings with removable louvers allow ample room to use an electric or air drill for doweling and bolting the motor to the foundation. These large discharge openings plus adequate air intake openings in the end bells provide cooling air at low velocities.

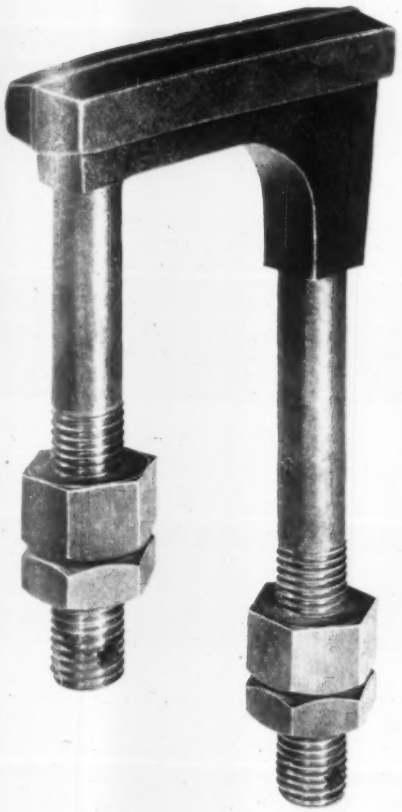
Sleek Appearance

You'll be proud of the appearance of the new Allis-Chalmers motor in your plant, too. Clean, simple lines and smooth contours give outward confirmation of its inner strength.

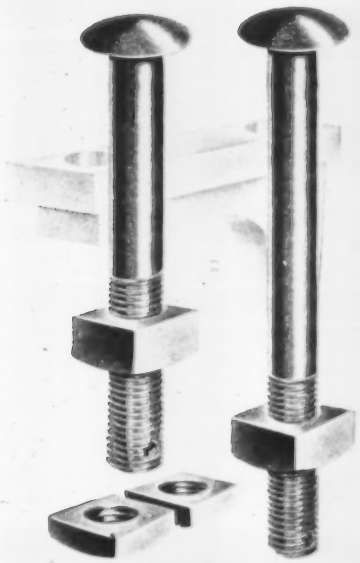
These new design Allis-Chalmers drip-proof and splash-proof bracket bearing squirrel-cage induction motors are built in sizes from 60 hp at 300 rpm to 1500 hp at 1800 rpm. Ask your Allis-Chalmers representative to show you the details of this exceptional new motor or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 05B7542.

A-3251

ALLIS-CHALMERS



Which would you choose?



Let's suppose you are faced with an unusual bolting problem. You have your choice of using a fabricated fastener, made up of many parts, and which might do a satisfactory job, or a specially designed unit fastener. Which would you choose?

Nine out of ten manufacturers, given such a choice, would pick the unit fastener. For they know that any fastener which is specially designed for a particular job can be counted on for greater economy and better all-around performance.

At our Lebanon, Pa., plant, specially designed fasteners are the rule rather than the exception. There is virtually no limit to the special types, shapes or sizes that can be produced at Lebanon. Coupled with this manufacturing know-how, we have a staff of engineers with long experience in the fastener field. Frequently their ideas or suggestions lead to changes in bolt design, resulting in improved performance, fewer parts, and economy in manufacturing.

In addition to designing and producing special fasteners, we also turn out a complete range of the every-day variety of bolts, such as machine and carriage bolts, lag bolts, rivets and spikes.

If you feel that some of your bolting items might be redesigned to serve you to better advantage, let us look into it. We'll advise you frankly, whether the answer is yes or no. Get in touch with the nearest Bethlehem sales office, or write to us at Bethlehem, Pa.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY
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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation.
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A Phillips LP-Gas (Philgas) plant is like having a gas well in your own back yard . . . you're protected against shut-downs and slow-downs due to gas shortages.

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Philgas is being used by many industries for all types of heat treating . . . such as core baking, mold drying, ceramic operations, food processing, textile finishing, space heating, etc.

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STEEL
The Weekly Magazine of Metalworking

VOL. 128 NO. 12 MARCH 19, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 160. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week **.. Will Raw Materials Supplies Be Adequate for Peak Output? ... Brass Strip Annealed and Cleaned Continuously ... Radioisotopes Aid Studies of High Temperature Materials ... How To Reduce Gear Failures**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

NEW GLASS FIBER TANKS IDEAL FOR PLATING SOLUTIONS, ACIDS AND MANY CLEANERS

Strong, Light, Economical PLA-TANK (T) Excellent for Use with Luster-on (R) Zinc Dips

Through the years many materials have been tried in the search for an ideal electroplater's or chemical processing tank. Latest of these is Fiberglas (R), impregnated and bonded with resins and molded into a seamless one-piece tank.

Sole sales rights on these new tanks for metal finishing, treating and chemical processing have been assigned to Chemical Corporation, 56 Waltham Avenue, Springfield, Mass. According to the company's Metal Finishing Department, the new PLA-TANK (trademark under which it will be sold) is strong enough for a man to jump on, light enough to be handled easily, resistant to enough acids, plating solutions, emulsion cleaners and similar organic compounds to be highly versatile, inexpensive enough to be very competitive, and available enough to permit standard sizes to be delivered in under thirty days.

PLA-TANK Fiberglas tanks are suggested for most of those uses which have previously required stainless steel, plastic or rubber-lined tanks, acid-proof stoneware or crocks. In case of severe physical damage, the PLA-TANK may be quickly patched on the job in a matter of minutes. Because of the newness of the product all literature is on a dated bulletin basis with new facts being released as soon as they are reported and verified. Available without cost are general descriptive sheets on PLA-TANKS, list of current sizes and laboratory report on acids and other solutions tested as to corrosive attack.

Chemical Corporation suggests that its PLA-TANKS are specially well suited for holding its LUSTER-ON Bright Dip and newest LUSTER-ON Olive Drab Dip for use on zinc-plated work. These finishes have gained added significance from recent NPA bans on use of cadmium and nickel. Although the Olive Drab is sold for United States Government orders only, the LUSTER-ON Utility-15 and -25 Bright Dips are still being offered for 1951 on an allotment basis to new customers who wish to convert to zinc and Luster-on for their civilian goods.

Free data sheets will be sent to those requesting them and engineering consultation is available for conversions. Inquiries on PLA-TANKS or LUSTER-ON should be addressed to Chemical Corporation, 56 Waltham Avenue, Springfield, Mass.

Advertisement

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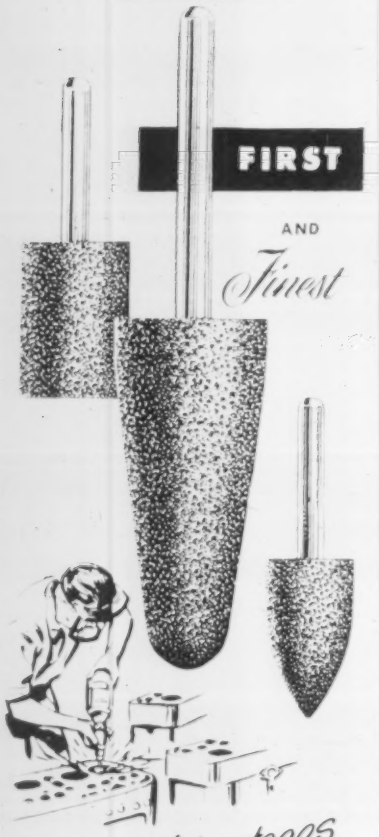
Mounted
WHEELS



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2. Stronger Mandrels—Special Analysis Steel
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Free Sample Wheel

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Chicago 7, Illinois

Behind the Scenes . . .

On the Job

The accompanying photo shows two STEEL editors at work at a shindig put on by Ford Motor Co. In the center, taking a drag on his cigaret is Detroit Editor Howard Tuttle. On

Howard's left is Associate Editor Art Allen. Continuing clockwise, you see Tom Morris of *Ward's Reports;* L. D. Crusoe, president of Ford Division; Stan Brams of *Business Week;* Ralph Watts of the *Detroit News* and Bill Black of the *Wall Street Journal.*

Handy

The U. S. Patent Office reports that one Harry Garlow of Flemington, N. J., has invented an auto mirror that gives a 360-degree view to the driver. The device consists of two mirrors—one at the driver's eye level, another at the top of a rod like a radio aerial outside the car.

By arranging the eye-level mirror appropriately, the driver can tell what's coming at him from above, below, behind, sideways.

Almanac

Signs of the times: Requests for information to STEEL's market men have increased markedly now that we're in an era of shortages and controls.

An aid to you may be a copy of a price and production chart. Originally prepared for the meeting of the Institute of Scrap Iron & Steel, the chart shows the 49-year trend of heavy melting scrap prices and steel output from 1902 to 1950. To get a copy, write Market Editor W. M. Rooney, Penton Bldg., Cleveland 13, O. First come, first served.

Byproduct

Norton Co., the abrasive maker, is musically inclined. For years it has made use of the tonal qualities in vitrified wheels as a means of grading its product. In 1911 at a meeting of salesmen and foremen, a part in the evening's program was presented to demonstrate the tonal qualities of Norton abrasive wheels. Eight to ten tool grinding wheels were set up on a stand and several simple tunes were played. The next use as an instrument came around 1925. A set of wheels was developed to show the application of sound as a method of grading. The commercial use of electrical apparatus for measuring the pitch of the ring of grinding wheels as a method of grading them was developed in connection with sound studies.

Originating in the Norton grading department, a set of wheels was used for musical purposes in an industrial program aired by WTAG in Worcester, Mass., about 1937. Gradually a Norton wheel-o-phone was developed that uses 21 wheels trued to correct pitch. Each wheel, with a rubber bushing, is mounted on a slightly inclined spindle supported by a wooden frame. The instrument looks something like a xylophone.

Cover Story

The photograph for this week's cover was obtained in New York several weeks ago during a clinic on subcontracting for the Air Force. New York Editor Ben Price rounded up a photographer from Wide World and had the photo shot at the Air Force Procurement offices.

Puzzle Corner

You scientists probably figured the answer to the March 5 problem in five seconds. The answer, of course, is five seconds.

On their wedding day, a man was twice as old as his bride. When the wife's age doubled, the combined ages of their boy and girl equalled the difference in the parents' ages.

At the present time the daughter is four times older than she was then and the combined ages of the boy and girl are equal to the mother's age, who is now as old as her husband was when he was one and a half times as old as she.

Six years ago the son was 2 years older than his mother was on her wedding day. What are their ages now?

Shrdlu

(Metalworking Outlook—page 29)

"Just what the doctor ordered!"

"We have a new Service Division. It's a separate group in our Sales Department set up to handle service work, such as hearth installations, refractory practice surveys, tests, etc. And the boys in the back room say it's a long step in the right direction.

"This Service Division's a chip off the old block. Just like their comrades in arms in the Sales Department, the Service men are ex-steelmakers. Years ago we found out that steelmakers make good refractory sales and service men. So we've always staffed our Sales Department with men with practical steelmaking experience. They hit the bullseye. And that's why we stick to our guns in hiring new hands for the Service Division.

"Our need for a special Service Division really started back in 1940. Venturing where angels fear to tread, we told the steel industry that our magnesia ramming mix, Ramset, might eliminate a lot of blood, sweat and tears on new hearth installations —in major hot and cold repair work, too.

"Well, the industry said, we're from Missouri. The proof of the puddin' is in the eating. And you gotta show us. So the die was cast and we undertook to supervise Ramset jobs with our limited Sales staff.

WERE WE SWAMPED!

"We were bears for punishment in those days. Pretty soon we found ourselves on the horns of a dilemma. The Sales Department was so busy on service work that they didn't have time to sell. We were robbing Peter to pay Paul. On the one hand we couldn't handle all the service work that needed doing. At the same time our men couldn't be out winning friends and influencing people. In fact, we were between the devil and the deep blue sea. It looked like Basic might soon be a case of out of sight, out of mind, with those customers who weren't getting as much service with a smile as they wanted.

"Naturally we didn't want absence to make the heart grow fonder for somebody else's products. So we took the bull by the horns. Nothing ventured, nothing gained, you know. With the new Division we have arranged to furnish service around the clock. And we aren't sending a boy to do a man's work. We want you to see that it pays to leave the plumbing to the plumbers.

"We saw the light on another point, too. We had the right products and the right men. But something was still missing. Clothes alone don't make the man. Right equipment was necessary to save the day.

MOTHER NECESSITY INVENTS

"Always before, we cut the pattern to fit the cloth—mixing Ramset by hand or in a concrete mixer, moving the tempered Ramset by wheelbarrow to the furnace and compacting the Ramset with backfill tampers. But recognizing that a job worth doing is a job worth doing well, that time is money and that handsome is as handsome does, we decided to get the right tools for the job.

"Seizing time by the forelock, we added an 18-cubic foot mortar-type mixer to our kit. It tempers Ramset rapidly without segregation or balling and permits maintenance of a uniform moisture content.

"A straight line is the shortest distance between two points, so we designed and had built a belt conveyor to match the capacity of the mixer. That eliminates wheelbarrow labor and delivers tempered Ramset from the mixer, OVER charging buggies, into the furnace.

"Realizing also that you can't drive a spike with a tack hammer, we fell to the task of finding a faster, better way of tamping Ramset into place. Even a blind hog turns up an acorn now and then and our rooting uncovered a mechanical tamper that gives Ramset what Paddy gave the drum. The new device has a blow that would fell an ox. It cuts down the manpower previously required, and saves plenty of silver seconds and golden minutes. That's our complete ball of wax—to date.

FIRST COME, FIRST SERVED

"And here's the deal: Since any worker is worthy of his hire, we've hung a 'For rent' sign on this equipment package. It's open for engagements on a bargain basis, calculated to cover amortization, maintenance and delivery to your door by our Service Division truck. Virtue being its own reward, we don't charge anything for the 24-hour supervision of your hearth and major repair jobs by the Service Division.

"To date only one complete package is ready. So renting the equipment is on a first come, first served basis. But it's only the beginning. We expect to have several other expanded equipment packages available soon. When that good day comes there need not be a case of he who hesitates is lost or of haste makes waste.

"Maybe you can't teach an old dog new tricks, but if practice makes perfect, you can be sure the jobs our Service Division undertakes will prove that experience is the best teacher.

"And we're not selling a pig in a poke because blazing a trail isn't a new experience for us. You remember it was our people years ago who paved the way on hearth installation techniques (including the use of forms) now used from the rock-bound coasts of Maine to the sunny shores of California.

"Just remember your success is our happiness. We hope you'll give us a chance to get to the bottom of your trouble.

"Yours for better bottoms,"

OLD BILL BASIC

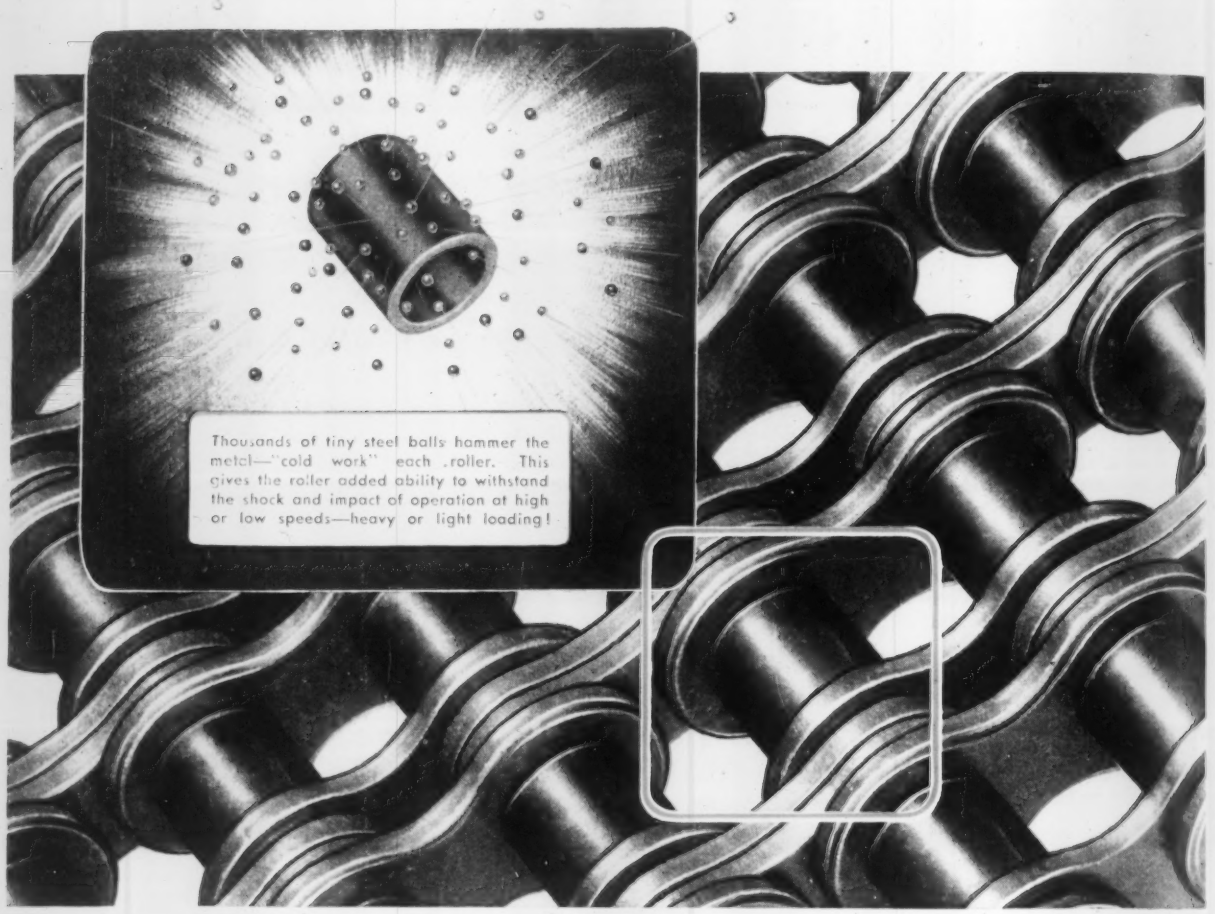
Basic Refractories Incorporated

845 HANNA BUILDING, CLEVELAND 15, OHIO

Get the roller chain with rollers that are

SHOT PEENED

for EXTRA fatigue life!


Thousands of tiny steel balls hammer the metal—"cold work" each roller. This gives the roller added ability to withstand the shock and impact of operation at high or low speeds—heavy or light loading!

You get this added feature in every LINK-BELT Roller Chain

You get absolute uniformity, too. No highs. No lows. Just smooth, flowing dependable chains that pay off in wide flexibility—greater performance—longer life.

You see, LINK-BELT Roller Chains are made from carefully selected materials with controlled heat treatment to assure uniformity and absence of weak members, then—rollers are shot peened to give them the extra fatigue life needed for today's higher speeds and heavier loads.

Link-Belt Roller Chain is available in single or multiple widths, in $\frac{3}{8}$" to 3" pitch and double pitch. If you have a roller chain problem, see the LINK-BELT engineer nearest you.

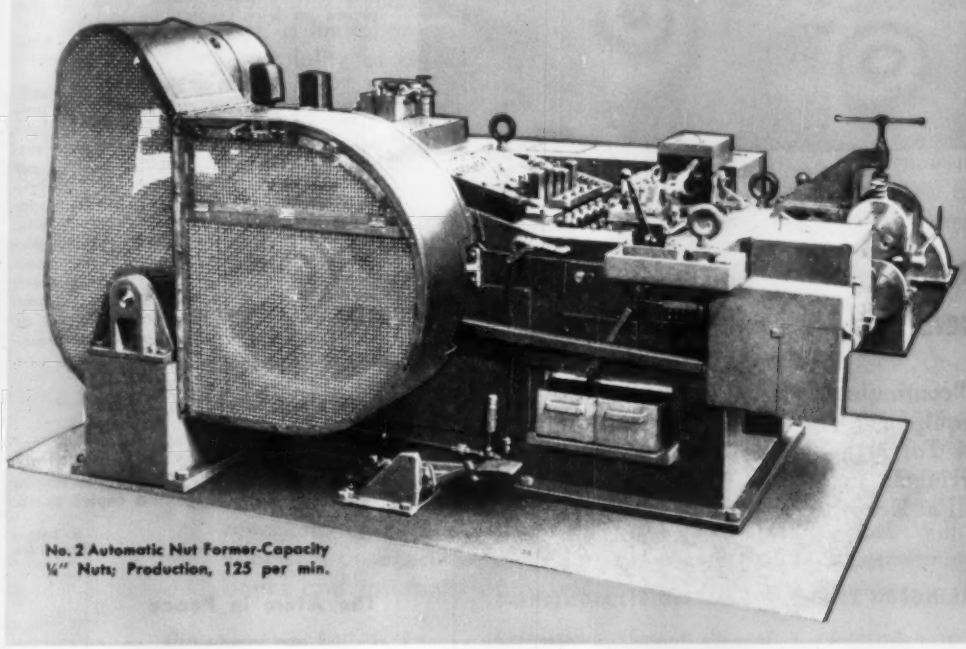
LINK-BELT

ROLLER CHAINS and SPROCKETS

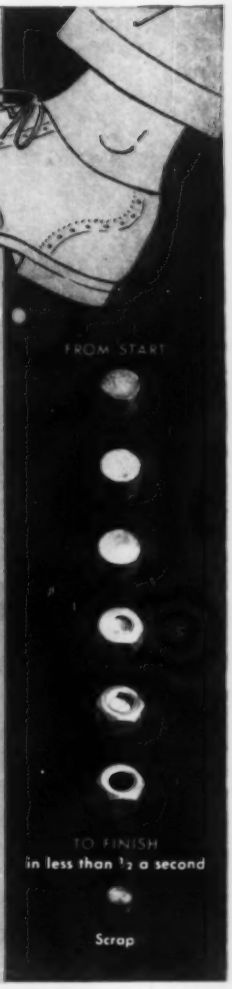
LINK-BELT COMPANY. Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices, Factory Branch Stores and Distributors in principal cities.

Waterbury-Farrel Announces

A NEW STEP FORWARD... IN AUTOMATIC NUT FORMING...



No. 2 Automatic Nut Former-Capacity ¼" Nuts; Production, 125 per min.



To step-up your nut-producing facilities, look to Waterbury-Farrel's new line of automatic nut formers.

Check these production-boosting design features.

HIGH SPEED—without sacrificing quality. Nut blanks need no subsequent operation except threading.

SIMPLIFIED TOOLING—larger tool holders.

EASY-TO-GET-AT ADJUSTMENTS—save "down" time.

NEW CUT-OFF DEVICE—of ingenious design.

SIMPLIFIED TRANSFER MECHANISM — with locking device for position.

HYDRAULIC CONTROL — for feed and brake action.

SAFETY-INTERLOCKED LUBRICANT PUMPS—for machine and tools. Machine cannot be operated until lubricant is turned on.

BLANK INVERTER—for work that must be turned over during sequence of operations.

Write, wire or phone for further information.

CENTENNIAL

We're always pioneering . . . we started 100 years ago on March 5, 1851. When we stop pioneering, we stop (period). In this ad you'll find evidence that we're going ahead, into our second century.

In Equipment, Experience Counts . . . We're 100 in '51!

WATERBURY FARREL FOUNDRY & MACHINE COMPANY

WATERBURY, CONNECTICUT, U. S. A.

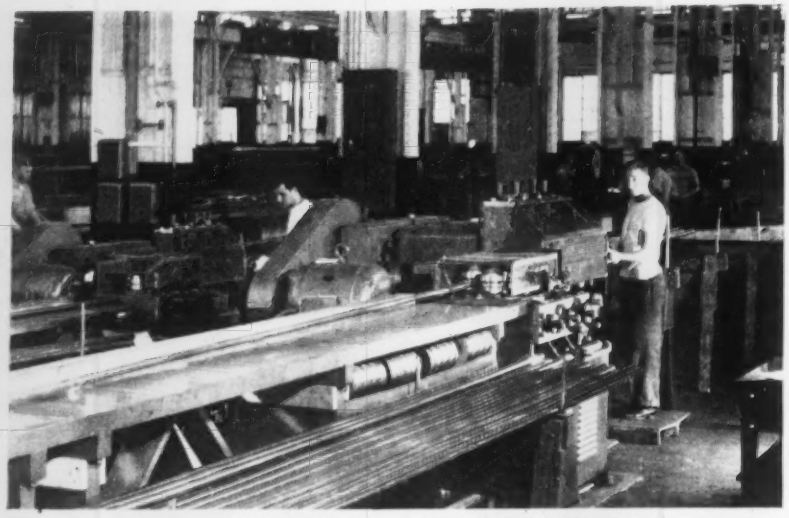
Sales Offices: Chicago, Cleveland and Newark

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY FARREL

COLD PROCESS BOLT AND NUT MACHINERY—Headers (all types) • Re-headers • Trimmers • Thread Rolling Machines • Slotters • Nut Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Multiple Plunger Presses • Hydraulic Presses, etc. *MILL MACHINERY*—Rolling Mills • Wire Flattening Mills, Chain Draw Benches • Slitters and various accessory mill machinery. *WIRE MILL EQUIPMENT*—Continuous Fine Wire Drawing Machines (Upright Cone and Tandem) • Bull Blocks • String-up Machines • Spoolers, etc.

FOUNDED WATERBURY FARREL 1851

WF-2



Torrington 12-Roll Tube Straighteners on the job for American Brass at Kenosha, Wis.

American Brass installs 4 Torrington Straighteners in new Kenosha Tube Mill

As part of a "continuing program of improving plant facilities and equipment", the American Brass Company has installed 4 Torrington 12-Roll Tube Straighteners and other Torrington machinery in the recently completed tube mill at Kenosha, Wisconsin.

FEATURES OF TORRINGTON 12-ROLL HIGH-SPEED STRAIGHTENERS

1. Versatile: handles round, hexagon, square or rectangular rods and tubes.
2. High-speed: processes up to 700 feet per minute.
3. Fast set-up and adjustment: rolls are overhung, without outboard bearings.
4. Long-life, trouble-free construction: all gears run in oil and are totally enclosed.
5. Anti-friction bearings throughout.
6. Flexible: has easily-adjustable power drive.
7. Positive action: all rolls are power-driven.

The Torrington line also includes both 12-Roll and 24-Roll Straighteners in a variety of models which can be adapted to your particular needs. Torrington skill, knowledge and experience, gained from more than 60 years of close collaboration and cooperation with metal mills, is at your service to help you with your problems.

Call or write Torrington for information and nearest Torrington representative

The TORRINGTON

MANUFACTURING COMPANY • TORRINGTON, CONNECTICUT

DESIGNERS AND BUILDERS OF MILL MACHINERY FOR OVER 60 YEARS

LETTERS

TO THE EDITORS

"Col" Right For Mill Price

We use STEEL as reference in work for Industry Division, Economic & Scientific Section, General Headquarters, SCAP. To facilitate this, please explain use of term "col"—appearing in Market summary each week to list prices on wire goods.

Lt. Col. R. J. Rice
c/o Post Master, San Francisco

• *"Col" means columnar—the prefigured mill pricing system used by producers of merchant wire products where standardization prevails. In this system, only one figure, the delivered net price, is given on producers' tables prepared for each size. Each column represents in dollars and cents the combination of base price, plus extras, plus freight. In a typical table, each succeeding column calls for a 5c per cwt increase. Customers find the column applying at their respective points by adding to the base column the proper freight from mill to delivery point.*

Pleasant Tune

Your editorial "Playing by Ear," STEEL, Feb. 5, p. 43, was read with a great deal of interest. We appreciate its message; have distributed copies to our associates.

B. Lytton
Markal Co.
Chicago

The Atom in Peace

We are conducting an educational program in Fort Wayne to acquaint people with constructive uses of atomic energy. Material and illustrations in an article, "Isotopes for Industry," by Colin Carmichael, STEEL, Oct. 4, 1948, p. 74, would be excellent for this purpose. Can we use the material?

M. C. Hallett
Works Laboratory
General Electric Co.
Fort Wayne, Ind.

• *Permission for use of material granted; illustrations forewarded.*

More Subcontracting Clinics

Can we get more information on the industrial subcontracting clinic organized by Case Institute of Technology and reported in STEEL, Feb. 26, p. 44. We face a similar problem here in helping smaller manufacturers get defense work and the Case clinic offers a constructive approach.

Ray M. Hudson, Manager
Industrial Department
The New England Council
Boston

• *Write Dr. Douglass Miller or Prof. Clay H. Hollister, Case Institute of Technology, University Circle, Cleveland. The Case clinic proved industry appreciates well-grounded help. Case expected 400-500 people; 1100 attended. If your Council plans a similar program, perhaps a display of parts open to subcontracting by prime contractors will enhance its value.*

The Metalworking Outlook

New Thinking on CMP

Majority opinion in Washington now favors an open-end type of Controlled Materials Plan. Left free would be the supply of controlled materials remaining after all defense and defense-support requirements are programmed. The planners believe that about 20 per cent of the materials will have to be controlled when CMP goes into effect, probably July 1. To ease the scramble for what's left, a limitation system is being considered which would grade the essentiality of civilian requirements.

MRO Tangles Mount

Snarl in the MRO order: Some sellers of materials for maintenance, repair and operations, for which users can issue their own DO orders, are writing DOs to accumulate inventories in advance of orders they may receive for the items. National Production Authority says, "No." The seller of MRO items must wait for DO-rated orders from his customers before he can pass them along to his own suppliers.

Renegotiation: Dampening Effect

What is the incentive for a manufacturer to dig out defense orders which make him liable to renegotiation proceedings when his competitor may decide to skip defense work in favor of pre-empting lost civilian business of the first manufacturer and avoiding messy renegotiation action? That's the poser tossed out by Col. Willard T. Rockwell, an executive officer in a score of metalworking companies, banks and insurance organizations.

Consumer Price Index Incorrect?

The government's new consumer's price index "overstates the cost of living for wage earners." So says the Commerce Clearing House which charges that the index shows an average advance in food prices, but consumers will buy food that has increased the least. Demand will be shifted to lower priced goods. People will shop more aggressively, CCH believes, for the better bargains. Trade-in values of consumers' possessions (autos or appliances) will be increased. Despite those hidden factors, watch the index become an increasingly important peg to which wage and price controls will be hooked more and more firmly.

Industry Stock Rises in Washington

Whatever the outcome in the labor-management dispute over how the Wage Stabilization Board should be constituted, industry has shown impressive strength in refusing to knuckle under to union demands. Industry is by no means dominant as an adviser to the Administration, but it now is in the strongest position it has held in years.

Boomerang in Price Order

Expect the much-touted manufacturers' price order to bring more decreases than increases. Last week OPS was still working on the

Production-Engineering News—p. 65 The Market Outlook—p. 129

order which is supposed to allow manufacturers to adjust their prices for cost increases since the Korean War began. Actually, the order will force industry to absorb many costs that have risen since last summer, including the new freight rate increase.

Railroads Get an Increase

Railroads by Mar. 29 will be permitted to boost freight charges 4 per cent in the eastern territory and 2 per cent in the southern and western territories. OPS is also working on metal price orders to roll back prices of tungsten, set ceilings on nonferrous scrap and revise some iron and steel scrap ceiling quotations.

Credit Controls Not Drastic

The Federal Reserve Board's plan to control credit on a voluntary basis won't hobble your expansion program as long as it's for defense or essential civilian needs. The FRB control program is a pale version of what it actually wants: A scheme making it mandatory for banks, life insurance organizations and investment banks to examine the purpose of each loan request. FRB will have to go to Congress to get the authority for mandatory controls.

Signs of the Times

Chrysler is reportedly considering building a plant in the Cleveland area now that Ford and Chevrolet are opening facilities there . . . Coming into greater use are warehouse finding systems whereby one warehouse that can't fill a steel order will pass it along to the next in a chain in the hope that one eventually has the scarce material; the buyer pays extra charges depending on how far down the line the order has to go . . . NPA may modify its aluminum distribution order to give more to warehouses . . . NPA is establishing 11 new field offices in a move to tighten up the administration of its construction orders.

What's Happening in Industry

Stampers fear a drop in 1951 from the $1 billion volume in 1950 as government curbs and materials shortages darken the outlook (p. 37) . . . Sheet and strip users will suffer as steel producers seek to comply with government requests to convert strip mills to plate (p. 37) . . . The proportion of steel to be set aside for defense is increased by a new Washington order (p. 39) . . . Certificates of necessity thus far granted by the U.S. cover, on the average, 74 per cent of the cost of individual expansions (p. 40) . . . Subcontracting clinics are one aid to the company that seeks defense work (p. 41) . . . Western European industrialists don't expect World War III this year (p. 47) . . . GM's Fisher Body Division has a $195 million contract to build tanks (pp. 42, 52).

Subcontracting Is Solution

Considerable concern is being manifested about the difficulty encountered by "small" industrial companies in obtaining government contracts. A common complaint is that normal procurement procedures of the military tend to distribute an undue percentage of contracts to large corporations.

Small companies have numerous well-intentioned representatives who are working hard to give them a better break. Several senators and congressmen have been especially active in this work. Characteristic is Sen. Hubert H. Humphrey's bill to create a new government agency to find ways of utilizing the facilities of small firms more extensively in the present emergency.

One difficulty with this approach to the problem is that it contemplates careful discrimination on the part of procurement agencies in placing contracts. However laudable the objective may be, this method imposes a terrific extra burden upon those whose principal responsibility is to place orders wisely and expeditiously. Obviously it is easier, simpler and more logical to place an overall order for ordnance to one large company than to split it up in small orders to many companies. The government simply is not organized to distribute contracts on a retail basis when wholesale lots are so much more efficient.

Therefore, the realistic approach to the equitable distribution of contracts is not through government agencies but through prime contractors. Every industrial giant which receives a large government contract has had in peacetime profitable relations with hundreds or thousands of small companies. Why not expand this relationship during the emergency through the time-tested medium of subcontracts?

Fortunately, the soundness of this approach is being demonstrated daily. The Air Force's Eastern Procurement District staged a clinic at which prime contractors displayed parts and components they desired to subcontract. Nearly 4000 potential subcontractors attended. One prime contractor placed $22 million in subcontracts, 40 per cent of which went to companies employing fewer than 100 persons.

Subcontracting clinics are making a hit wherever they are held. They are the logical solution of the small company's problem. Their appeal is based upon a natural inter-company relationship, not upon a labored, unrealistic magnification of governmental bureaucracy.

E. L. Shaner

EDITOR-IN-CHIEF

STAMPERS FEAR CUT: Metal stampers are plagued by shortages of materials and government restrictions. The industry, consisting of 2000 companies only 400 of which employ more than 50 persons, shipped an estimated $1 billion worth of ferrous and nonferrous stamp-

ings last year. Company executives fear that production will be reduced as much as 30 per cent in the next six months.

The most difficult job of conversion in the industry will be encountered by the straight jobbing shops, which turn out components for automobiles, household appliances, etc. On the other hand, most specialty shops will experience little difficulty in shifting to defense work. Already some of these companies find that 40 per cent of their volume bears DO numbers.

For all types of shops the immediate problem is shortage of materials. Stampers seek steel from four sources—mills, customers, warehouses and gray market. Today more steel is supplied by customers than ever before. Probably 15 per cent of the steel now being purchased is premium-priced metal. —p. 37

* * *

SIMPLIFIES REPAIRS: When screw threads in a casting which hold a cap screw or stud are stripped or become worn, the conventional method of replacing them is to drill a larger hole and tap it for a larger screw or stud. This is a time-consuming operation and often the necessity of inserting larger screws or studs introduces other complications.

An eastern company has developed stainless steel helical-wire thread inserts which reduce the time required to repair damaged threaded holes and also permit use of screws or studs of the original size. The damaged thread is cleaned out by drilling a hole slightly larger in diameter than the major diameter of the original thread. The new hole is tapped with an oversize, special threaded tap. The helical thread insert is screwed into the hole. Its external threads are identical with those of the special tap and its internal threads conform to the threads of the original screw or stud. —p. 89

* * *

MORE AUTOS JUNKED: A partial explanation of the large tonnage of scrap produced in 1950 is found in statistics compiled by R. L. Polk & Co. which show that an unprecedented number of autos and trucks were junked in that year. The number scrapped in 1950 not only was substantially higher than that of 1949 but it was 50 per cent above the annual average for the last 26 years.

Another impressive comparison is that the number of vehicles scrapped in 1950 exceeds by a slight margin the yearly average of new vehicle registrations for the last 26 years. For 1950 alone, passenger car scrappage was 36.6 per cent of new registrations and the number of trucks sent to graveyards was 60.4 per cent of new registrations. —p. 52

* * *

BIG SOLICITS SMALLS: In most discussions on defense orders for small companies, the little shop is cast in the role of seeker and the big prime contractor is depicted as an outfit that is not too much interested in farming out work. Much evidence is coming to light to show that this picture is distorted.

In many cases the exact opposite is true. For instance, Ford Motor is seeking help from independent small businesses on its $565 million orders for Pratt & Whitney engines. A Ford official says: "In order to weld together as strong a production team as possible and to spread the base of our aircraft engine production and to bring into this team as many independent businesses as possible, we will go outside the company to buy many of the parts we will need for these engines."

This is sound policy and it is good business for both prime and subcontractors. —p. 41

* * *

THE TIDE HAS TURNED: Present trends in foreign trade are subject to interesting interpretations on both sides of the Atlantic. Western European industrialists, convinced that World War III will not occur this year, note a perceptible slackening in industrial exports. They say the bloom is off the sellers' export market and that competition is stiffening. German exporters look for a general decline in world trade and a resultant easing of production.

In Washington, government officials who a few years ago were worrying about the excess of our exports over imports, now are wondering if the tide has turned too much. Recently the margin of imports over exports has been mounting. In January imports totaled $1022.3 million, a new high, and exports were $972.3 million. For a long time our experts have been saying that a more even balance of trade would be beneficial. Now that we have it, they wonder.

—pp. 44, 47

Stampers Face Two-Way Squeeze

The stamping industry's 1950 volume of $1 billion may slip in 1951 because of aluminum and steel scarcities and government controls on civilian output

METAL stampers are squeezed by materials shortages on one side, by government restrictions on the other. The 2000 companies that shipped an estimated $1 billion worth of ferrous and nonferrous stampings in 1950 fear that production levels will sag as much as 30 per cent in the next six months.

Troubles Ahead—Hardest hit will be straight jobbing stampers who turn out components for other manufacturers and make 60 to 65 per cent of all stampings manufactured. Two-thirds of their production is automotive, and auto customers will be forced to cut back beginning in the second quarter. Much of the other third of the jobbing volume is for home appliances, another end-product that will get the axe beginning in the next quarter. Producers of finished stampings are not so worried about government restrictions, but their problem, in common with the jobbers, is materials. Pails, ash cans, garbage cans, home and commercial canning closures, crowns and household and hospital utensils are among the finished products that account for 35 to 40 per cent of the stamping industry's dollar volume.

In the best position on defense work are specialty stamping shops. Some of those companies find as much as 40 per cent of their volume bearing DO numbers, says Orrin Werntz, executive secretary of the Pressed Metal Institute. They are making components for jet aircraft, small arms, military vehicles, electronic devices, ships and other products. In World War II, some shops kept in business by installing new equipment to make items unrelated to stampings. In a part war, part peace economy that course may not be open to many companies, particularly the smaller ones.

Materials Headache—All stampers are wrestling with the problem of materials shortages. Most producers find the DO system ineffective in getting materials. Aluminum is harder to get than steel, but the latter metal is by far the most serious obstacle because so much of it is used. Most stampers get their steel from four sources—mills, customers, warehouses and the gray market. More steel than ever before is now being supplied by customers. As of last summer, twice as much steel came from warehouses as eight years before, a Pressed Metal Institute survey shows. As of last summer, 12.5 per cent of the steel used was "premium" metal—material that came either from the gray market or from other sources which charged a higher price. That percentage is even greater now.

Stampers feel their materials problems are aggravated by the nature of the industry. In total, it does a large business, but the companies within the industry are mostly small and can't pull a lot of weight in purchasing. Of the 2000 companies in the business, only 100 employ more than 50, only 800 employ more than 20.

More Plate, Less Strip

Sheet and strip users will suffer as producers convert mills to roll more plate

SHEET and strip supplies will become even tighter as steel producers seek to comply with government requests that plate production be boosted to 700,000 tons a month.

About 550,000 tons of plates were being turned out monthly in the last quarter of 1950. The difference of 150,000 tons will have to be obtained by using some continuous sheet-strip mills for plate production. The conversion job is not excessively difficult; usually the most extensive mill equipment modifications required are longer run-out tables and heavier shears.

In the Works—The government has already begun encouraging the conversion by arranging set-aside quotas on sheets so low, that a company is practically forced to make plates, and by allocating plate tonnages for the railroad program to producers who have to convert to meet the allotments. Some steel producers are already making plate on their strip mills. Republic Steel Corp., which normally rolls very little plate, is now producing substantial tonnages.

Much of the additional strip plate to be produced will go to the railroad and other programs where large tonnages are needed. It's not practical to use a continuous strip mill for small plate tonnages. Smaller-tonnage and heavy jobs will be rolled on regular plate mills. Many strip mills can roll plate up to $\frac{3}{4}$-inch thick. Nearly all strip mills to be converted will be able to make $\frac{1}{2}$-inch plate at least. About the same amount of plate as strip is yielded from 100 tons of ingot steel.

Lower Requirements—NPA recommends that plate buyers ordering from strip mills:

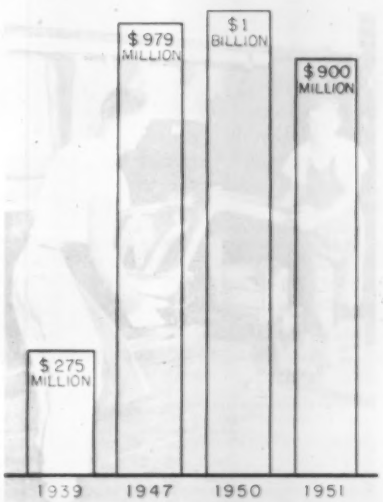
Order only in amounts of ten tons or more for each size and grade of plate needed.

Arrange to do their own shearing where strip mills are not equipped to shear long edges, and waive standard shearing and camber tolerances from those mills unequipped to meet them.

Modify specifications where possible to eliminate transverse test requirements.

Re-examine size specifications to adapt their needs to strip mill sizes.

Stampings Shipments May Drop

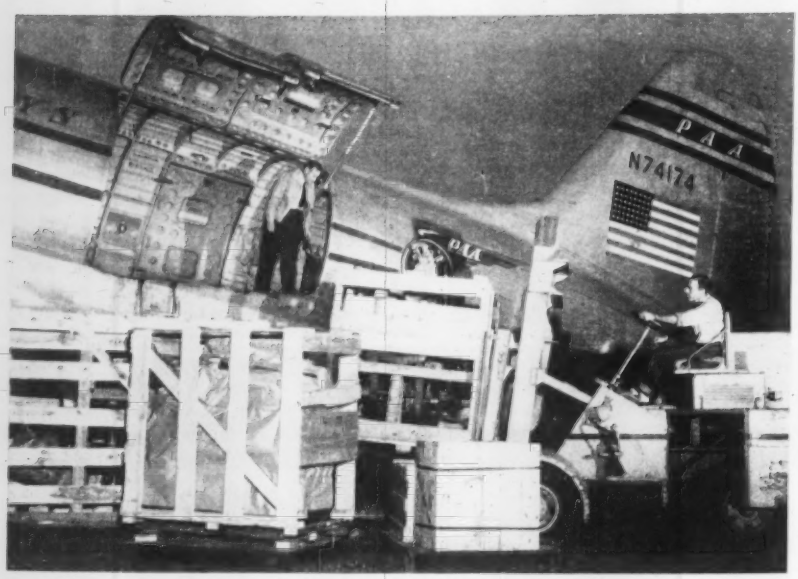


Source: Census of Manufactures for 1947; figures for other years estimated by STEEL

NPA To Aid Machine Tool Maker

Machine tool makers can now get help from NPA in getting machine tools they themselves need.

Procedure calls for machine tool manufacturers to apply directly to the machinery division of NPA for priority assistance. They must, however, give detailed information on tools they require, tell why they are needed, and show why they can't get



LOSING NO TIME: Vital machinery for a branch Ray-O-Vac battery factory in Sao Paulo, Brazil is being speeded south via Pan American World Airways cargo Clipper from Miami, Fla. The two-day air trip eliminates trans-shipment from a seaport in Brazil to the inland industrial city and will enable the plant to get into operation weeks sooner than expected

along with something else. Also required is evidence that a priority rating is the only means by which they can get the needed tools.

Previously, machine tool makers had sought help from the Munitions Board, but the agency is limited in issuing DO ratings to those machine tools actually needed to fill defense orders on the contractor or subcontractor level.

Steel Merger Under Discussion

Discussions are still underway on the proposed merger of Pittsburgh Steel Co. and Allegheny Ludlum Steel Corp., but nothing is definite.

Pittsburgh is going ahead with its expansion and modernization program. The company has a $56 million certificate of necessity and will enlarge 12 open-hearth furnaces so they'll each have a capacity of 250 tons. One has already been rebuilt. The firm's present ingot capacity of 1,072,000 tons will be increased to 1,560,000 tons when the open-hearth project is finished.

Pittsburgh's other expansions include installation of a new high lift blooming-slabbing mill scheduled for completion next August and a 66-inch hot and cold rolling mill to produce sheets up to 60 inches wide.

Extra Depreciation Permitted

Above-normal depreciation is being allowed by the armed services as a legitimate cost under cost-plus contracts when the contractor operates on a multi-shift basis.

The rates allowed are those permitted by the Bureau of Internal Revenue. On a $100 item, for example, the normal depreciation allowance is 10 per cent whereas on a two-shift basis the allowance is 13 to 14 per cent.

Under a fixed-price contract the contractor is supposed to include above-normal depreciation cost in his fixed price if he proposes to operate with more than one shift. But some of those contracts permit a price redetermination at a later date.

New Truck Association Formed

Industrial Truck Association has been formed by builders of gas and electric trucks, powered hand trucks and makers of batteries and battery-charging equipment. President is C. B. Cook, vice president of Elwell-Parker Electric Co., Cleveland. Vice president is Elmer F. Twyman, general manager of the Philadelphia division of Yale & Towne Mfg. Co. William Van C. Brandt is managing director, secretary and treasurer. His headquarters are at 3701 N. Broad St., Philadelphia.

Chairman of the truck section is John A. Baldinger, assistant general manager of Yale & Towne's Philadelphia division. N. W. Heinritz, vice president of Gould National Batteries Inc., Trenton, N. J., is chairman of the battery section. Gordon J. Berry, vice president of Electric Products Co., Cleveland, is chairman of the charging equipment section.

Electric truck makers were formerly organized as Electric Industrial Truck Association.

The association will furnish time, cost and labor-saving facts on powered industrial trucks.

Sentner To Succeed Cole

Richard F. Sentner, United States Steel Co., Pittsburgh, has been appointed deputy director, Iron and Steel Division, National Production Authority, which means that under the rotational plan for industry cooperation, he will automatically replace the present director, Melvin W. Cole, when the latter returns to his connection with Bethlehem Steel Co. Mr. Cole's term of service is roughly defined as "four to six months."

February Steel Ingot Output: A Whopping 7.7 Million Tons

NEW PRODUCTION records continue to flow from the steel industry. One of the latest is output of more steel for ingots and castings in February than ever before for that month. In setting that record the industry produced 7,762,000 net tons, the American Iron & Steel Institute reports.

That whopping February production raises output for the first two months of 1951 to 16,605,167 tons, or 12 per cent more than in the first two months of last year.

The February record was set despite adverse effects from railroad switchmen's work stoppages. In setting the record, steelmaking furnaces were operated at 97.1 per cent of capacity, compared with 99.9 per cent in January and 89.1 per cent in February, 1950.

January output of 8,843,167 tons was the greatest monthly production in history.

Detailed production figures for the first two months are shown below.

Period 1951	Open-hearth Net Tons	Open-hearth % Capac.	Bessemer Net Tons	Bessemer % Capac.	Electric Net Tons	Electric % Capac.	Total Net Tons	Total % Capac.	Calculated Weekly	No. weeks in mo.
*Jan.	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
†Feb.	6,937,000	99.3	326,000	75.6	499,000	86.1	7,762,000	97.1	1,940,000	4.00

Note—The percentages of capacity operated are calculated on weekly capacities of 1,746,337 net tons open-hearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951, as follows: Open-hearth 91,054,020 net tons; bessemer 5,621,000 net tons; electric 7,554,630 net tons; total 104,229,650 net tons.
* Revised. † Preliminary figures, subject to revision.

Timken Expands

It has a necessity certificate to build three electric steel furnaces in a $5.5 million program

TIMKEN Roller Bearing Co. has received a certificate of necessity covering construction of three top-charge electric furnaces.

The units will boost overall production to 625,000 ingot tons annually, an increase of 15 per cent. At the same time, electric furnace ingot capacity will be increased by about 80 per cent. Construction of the new furnaces marks a trend toward production of high-alloy electric steel only. When completed, the new units will replace three open-hearth furnaces.

Part Approved—The expansion program will cost $4,503,000, of which the government has approved $3,497,000 to expand the melting capacity. The remainder covers equipment orders for which a certificate of necessity is pending. That involves expansion in the seamless tube mill to utilize the additional steelmaking capacity. The tube mill project will provide additional alloy seamless tubing for antifriction bearings.

Timken says it decided to concentrate on electric furnace capacity because the company would then not be so dependent upon pig iron supplies and because Timken can efficiently integrate that type of facilities with its existing electric equipment.

Plan Five New Bearing Plants

A long-range program to add five new branch plants which will boost productive capacity by at least 50 per cent is planned by Cleveland Graphite Bronze Co., Cleveland. Between $15 million and $25 million will be needed to finance the project.

The build-up of new facilities for making bearings, bushings and other precision products has been necessitated by increased military and industrial demands, company officials state. The new branches will be built in small communities for reasons of dispersion, security and manpower supply.

McKee Builds Fairless Furnaces

Arthur G. McKee & Co., Cleveland will design, furnish and erect two blast furnaces and auxiliary equipment for U. S. Steel Co.'s Fairless Works at Morrisville, Pa. The furnaces will have 28 foot hearths and a daily capacity of 1500 tons of pig iron.

Facilities contracted for include three stoves for each furnace, a cast house, gas cleaning equipment, and skip and bell hoists for filling the furnaces.

U. S. Ship Launchings Drop

Only 52 ships with a gross tonnage of 437,031 tons were launched by U. S. shipyards in 1950, Lloyd's annual summary of newly launched vessels shows. This is a drop of 196,275 tons from 1949. Not included in these figures were 19 ships totaling 275,852 tons, launched for registration in other countries. Most were oil tankers.

World total outside the Iron Curtain countries rose about 10 per cent to 3,492,876 tons despite slumps in the U. S. and Canada. The gain is attributable to increases recorded by world-leader Great Britain, Japan and West Germany, listed for the first time since the war.

The figures record merchant vessels weighing 100 tons or more and cover launchings only. They do not take into consideration whether the vessels were completed in 1950 or are still under construction.

Scrap Iron Source: Slag Hills

A tip to steel mills searching for sources of scrap iron: Look in your own back yard.

For years, waste and scrap skimmed from cooking metal have been piled in large slag hills outside of mills. Such hills contain up to 6 million cubic yards which can be sifted.

One company recovered 3500 tons of iron in one month, and leveled the slag residue pile at the same time.

CARVING A CARCASS: Acetylene torches are cutting 15 streamliner luxury cars into scrap at the Omaha, Neb., headquarters of Union Pacific Railroad. In operation since 1936 on West Coast runs, the cars have been replaced by new equipment and will now help alleviate the current scrap shortage

More Steel For DO's

MRO program and military needs force increase in set-asides of steel for rated orders

EFECTS of the liberal MRO program and the boom in military orders are beginning to show. They forced National Production Authority to require steel mills to increase the amount of steel they reserve on their order boards for filling of defense-rated orders.

Some thirty products are covered. Increases range from 3 percentage points in the case of coated carbon steel sheets to 28 points for electrical sheets and strip. On one of the big tonnage items, hot-rolled carbon sheets, the set-aside is now 25 per cent. Previously it was 17.

Rough On Stainless — Particularly hard hit are some ten stainless steel products, set-aside being boosted from 25 to 50 per cent on eight of them. Hot and cold-rolled stainless steel sheet reservations are now 40 per cent, up 15 points.

No change has been made in the lead time for filling rated orders. Reserves for most steel castings, fabricated steel forgings, structural steels, piling, ingots, rails and skelp were not increased.

For Reference—Set-aside tonnages for the various products, compared with the previous schedule, are:

	Old	New
ALLOY STEEL	%	%
Wire Rods	25	45
Plates, except rolled armor	20	25
Wheels	0	5
Axles	0	5
Electrical Sheet & Strip	7	35
STAINLESS STEEL		
Tube Rounds	25	50
Sheet Bars	25	50
Plates, except rolled armor	25	50
Bars, hot-rolled	25	50
Bars, cold-finished	25	50
Mechanical Tubing	25	50
Pressure Tubing	25	50
Wire, drawn	25	50
Sheets, hot-rolled	25	40
Sheets, cold-rolled	25	40
CARBON STEEL		
Tube Rounds	15	30
Wire Rod	15	20
Wheels	0	5
Axles	0	5
Bars, hot-rolled	15	20
Standard Pipe	5	10
Line Pipe	5	10
Mechanical Tubing	15	25
Wire, nail	5	10
Wire, barbed	5	10
Sheets, hot-rolled	17	25
Sheets, coated except galvanized	10	13
Blooms, Slabs & Billets	10	20
Billets, projectile & shell quality	a	b
Plates, except rolled armor	20	25c

a) No limitation set; was subject to direct negotiation.
b) 25% of carbon blooms, slabs and billets tonnage set aside
c) Hot-rolled sheet producers must also set aside for plates an amount equal to 5% of average monthly shipments of hot-rolled sheets in base period Jan. 1 through Aug. 31, 1950.

Tax Write-Off: 74%

That's average granted in certificates of necessity for 313 expansion projects

CERTIFICATES of necessity permitting rapid tax write-off on outlays for defense production expansion were issued to 231 companies for 313 projects between Jan. 25 and Mar. 7.

The projects will cost an estimated $1,183,421,159. Average tax write-off certification is 74 per cent.

Earlier, certificates were granted for 228 projects costing $1.5 billion.

Percentage on Merit—The percentage of tax write-off is determined individually for each certificate issued. Percentage is based on the relationship the proposed expansion project bears to the direct defense effort and the anticipated economic usefulness the facility will have after the emergency period. A facility for making military specialty items, for example, is granted a higher rate of tax write-off than is a facility for manufacturing products which will be marketable in peacetime.

Applications for certificates are filed with the Defense Production Administration. They then are referred by DPA for recommendation and report to: Department of agriculture; department of commerce; department of interior; or the defense transport administration of the Interstate Commerce Commission.

Across the Board—Production from the new facilities will include a variety of products—steel, munitions, paper, fabrics, fuels, transportation and metalworking products and tools.

Among the larger certificates granted: Pueblo Steel Corp., Pueblo, Colo., $80 million for seamless and merchant pipe; Bethlehem Steel Co., $94.6 million for steel, raw materials and transportation; Detroit Steel Corp., $47.8 million for steel; Kaiser Steel Corp., $15.5 million for iron ore, pig iron and steel sheets; General Electric Co., $15.9 million for electronic equipment; Westinghouse Electric Corp., $24.5 million for aircraft supplies; Timken-Detroit Axle Co., $15.6 million for axle transfer cases and parts; International Business Machines Corp., $17.9 million for ordnance supplies; National Steel Corp., $15.4 million for pig iron at Weirton, W. Va.; Republic Steel Corp., $21.5 million for seamless tubing at Chicago.

Clamp Down on Expansions

Government spokesmen will not say so directly, but it is known that the reason for the crackdown on expansion projects was the sudden rash of new steel plant proposals which has been sweeping from one end of the country to the other. Some of these have been long as to political pressure, but short as to availability to raw materials, manpower, management—and adjacent consumers. Caught in the jam are quite a few expansion programs, filed as long ago as January, by major producers.

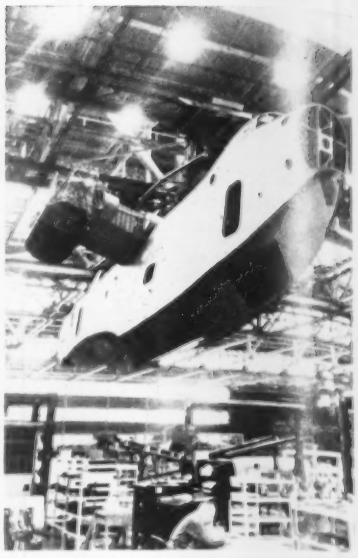
Will certificates of necessity be granted in the cases of the expansions planned by major steel companies? STEEL was unable to get a "yes" or "no" answer to this question. A lot of expansion, officials say, already has been approved for fast amortization; in general, they say, the expansion projects already approved should prove sufficient to permit a balancing of steel demand and supply by 1953. Some more certificates of necessity probably will be granted, they say, but only after the expansion program as a whole has been thoroughly studied and brought into balance as to raw materials and semifinished and finished products.

Demuth Heads ASTE

J. J. Demuth, superintendent, Sligo Inc., St. Louis, was elected president of the American Society of Tool Engineers for 1951-1952 at the society's annual meeting in New York. He succeeds Herbert L. Tigges, executive vice president of Baker Bros., Toledo.

Other officers are: First vice president, L. B. Bellamy, manager, Detroit office, Sterling Grinding Wheel Co., Detroit; second vice president, Roger F. Waindle, general manager, Industrial Products Division, Elgin National Watch Co., Elgin, Ill.; third vice president, Thomas J. Donovan Jr., Donovan Co., Philadelphia; secretary, W. A. Thomas, superintendent of tool engineering, Ford Motor Co. of Canada, Windsor, Ont.; treasurer, H. C. McMillen, general superintendent, Seeger Refractory Co., Evansville, Ind.; assistant secretary-treasurer, Dr. Harry B. Osborn, Jr., technical director, Tocco Div., Ohio Crankshaft Co., Cleveland.

Besides Messrs. Bellamy, Demuth, Donovan and Osborn, these men were elected to the board of directors: H. E. Collins, chief tool engineer, Hughes Tool Co., Houston; Joseph P. Crosby Jr., vice president, LaPointe Machine Tool Co., Hudson, Mass.; E. W. Ernst, superintendent, Punching Tool & Die Division, General Electric Co., Schenectady, N. Y.; G. A. Goodwin, chief process engineer, Master Electric Co., Dayton, O.; Ben J. Hazewinkel, L. S. Starrett Co., Denver; W. B. McClellan, engineer, Gairing Tool Co., Detroit.



BUZZING WITH ACTIVITY: Both the factory and the demonstration grounds of Glenn L. Martin Co. in Baltimore are buzzing these days. Above, a P5M-1 Marlin antisubmarine plane hull takes another hop down the assembly line. Evidently pleased with the Marlin, the Navy has just given Martin a fourth order doubling production of the plane. Hanging from an overhead crane without outer wings and other equipment, this Marlin won't be in the air for weeks. The ship will be fitted with hydroflap rudders for maneuverability on water. Below, the Canberra twin-jet light bomber recently flown to this country from England, is demonstrated to top Martin personnel outside the Baltimore plant. The Air Force's Air Materiel Command has been directed to issue an order to Martin to build an undisclosed number of a night intruder version of the Canberra

Opportunity Knocks: Subcontract Clinics

They're one practical aid in getting defense work. You get a chance to look over the components and parts that are needed then figure if you can make them or not

JOE MORROW is head man in a 65-employee company fabricating hair dryers and other beauty shop equipment. He can't get enough steel, aluminum and copper to continue his normal production.

He wants to get into defense work. But how?

Joe's problem is shared by thousands of metalworking companies as they face up to the new materials cutbacks to take effect Apr. 1. How can they get defense contracts or subcontracts?

One practical aid is the subcontracting clinic. Often it supplies the answer to the problem of the smaller manufacturer who is looking for subcontracts.

Meet the Primes—Nearly 4000 would-be subcontractors—93 per cent in the small business category—swarmed through a clinic staged by the Air Force's Eastern Procurement District in New York in the first five-day session. They examined parts and components which the prime contractors wanted to subcontract. They reviewed the specifications. They talked with the prime contractors about costs, inspection, tolerances, equipment, manpower, materials and capacities.

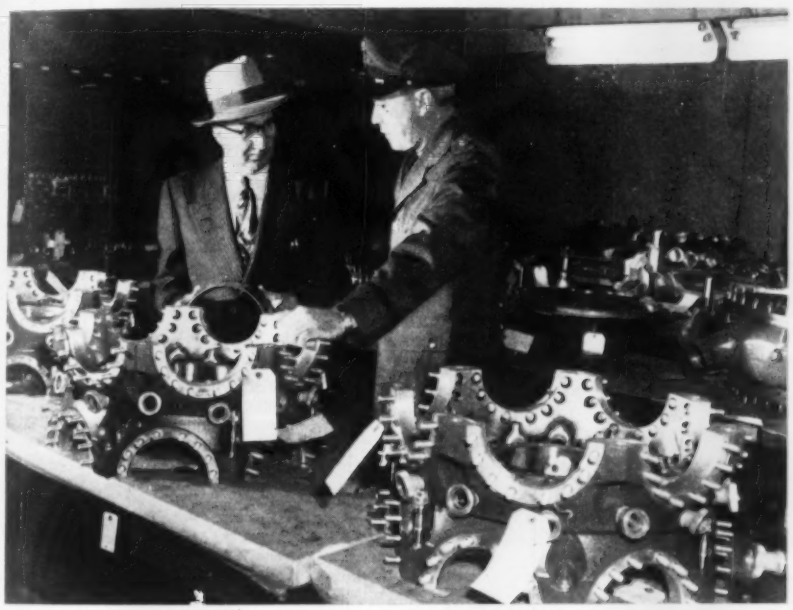
Many found items which they could make with existing equipment in their shops. Others noted they could make wanted parts and components with minor changes in their shop setup. They went home to figure their own costs and to compile data on their companies required by the prime contractors. Within a matter of weeks, many will have subcontracts.

Held Over—So successful was the clinic that the Air Force held the exhibit over for a second week. Maybe Eastern Procurement District will put it on a permanent basis. Other procurement districts in the Air Materiel Command in Boston, Chicago, Detroit, Los Angeles and Ft. Worth may stage similar clinics.

One prime contractor, Bendix Radio Division, Bendix Aviation Corp., reported at the clinic that it had placed subcontracts totaling $22 million. Forty per cent of these went to companies with fewer than 100 employees.

Subs Analyze Capacities—Case Institute of Technology sponsored a defense contract conference in Cleveland Feb. 20 (STEEL, Feb. 26, p. 44). Nearly 1100, more than twice the number expected, attended. Case distributed 750 defense capacity analysis sheets and invited would-be subcontractors to list production equipment, product range, tolerance capabilities and other data on plant and manpower. This information in turn is being made available to military procurement offices and to prime contractors. Last mid-week, 467 manufacturers had filed the data sheets and an additional 350 sets were requested by other companies.

Objective of the Case clinic was to explain to manufacturers how to go about obtaining defense contracts or subcontracts. It did not include any



SUBCONTRACTING OPPORTUNITIES GALORE
. . . Pratt & Whitney engine contains 20,000 parts

Looking over the tuning unit in a radar assembly in the cover photo are (left to right): Murray Quartin, New Haven Screw Machine Products Inc., New Haven, Conn.; Robert E. Wise, manager of subcontracting, Bendix Radio Division of Bendix Aviation Corp., Baltimore; Brig. Gen. Arthur Thomas, chief, Eastern Air Force Procurement District, New York, and J. H. Mills, Electronic Indicator Corp., Brooklyn, N. Y. Bendix has opened the subcontracting door: $22 million has been farmed out, 40 per cent went to companies with fewer than 100 employees.

Ford Needs Help for $565 Million in Orders

INDEPENDENT companies are being sought by Ford Motor Co. to help execute its $565 million orders for Pratt & Whitney engines, says Maynard T. Murray, general manager of the Ford Aircraft Engine Division, 20 N. Wacker Drive, Chicago.

The P&W engine contains 20,000 parts, of which 2000 are different parts.

Ford will manufacture 200 of these parts at its Chicago plant and may make others at Ford plants in Detroit and Cincinnati.

But "in order to weld together as strong a production team as possible to spread the base of our aircraft engine production and to bring into this team as many independent businesses as possible, we will go outside the company to buy many of the parts we will need for these engines," says Mr. Murray.

Ford is negotiating with large and small subcontractors to supply items necessary to build the engines. More than 80 per cent of the companies which already have received subcontracts are in the small business category, employing fewer than 500.

exhibit of parts and components available for subcontract work. Military procurements methods were outlined and successful prime and subcontractors described the procedures they used to obtain defense work.

Clinic Days—As a result of the Case conference, several other organizations are investigating or planning similar clinics.

The New England Council, Boston, asks for organization particulars. "We have the same problem here of helping our smaller manufacturers to get defense work to offset the shrinkage in their businesses due to material restrictions."

Woodbury College, Los Angeles, is considering a clinic.

The Toledo Chamber of Commerce asks for suggestions on methods for packaging data on available industrial facilities for transmittal to procurement officers. James G. Steger, manager of the Industrial Department, says: "We believe the greatest advantage of such a program is to promote the idea of progressive salesmanship on the part of the smaller firms."

A Road Show—Many large contractors need subcontractors badly right now. Some of these stage their own subcontracting clinics. Wright Aeronautical Corp., Wood-Ridge, N. J., organized a one-company parts show and put it on the road. After visiting 16 production centers, the company found more than 5000 probable subcontractors for its aircraft engine orders.

In World War II, many prime contractors broke down models of equipment they were producing for the armed services, invited potential subcontractors in to take a look at the parts and specifications to see what they could produce.

What the Primes Advise—If you are looking for subcontracts, here is what the prime contractor will want to know: Your production equipment, the size range and tolerance capabilities; plant floor space, with complete dimensions; number of employees and skills; engineering and supervisory personnel; what you made in World War II and how much; your peacetime products and processes; financial and commercial ratings.

Many successful subcontractors prepare brochures setting forth all the pertinent facts concerning their companies for distribution to prime contractors and to procurement officers.

Prime contractors may want their engineering representatives to inspect the plant of the potential subcontractor before awarding subcontracts. Guides for such inspectors should include production men, willing to demonstrate operations, as well as sales or management men.

PRODUCTION PLANNING: Preliminary design drawings for a landing gear position indicator are reviewed by officials of Riverside Metal Co.'s Keystone Watch Case division, Riverside, N. J. Keystone is producing the indicator and a "rocket trap and spacer" assembly for the Air Materiel Command. Pictured here are Bernard Blackman, superintendent of the Keystone division; James T. Duffey Jr., President of Riverside; and George Peterson Jr., manager of special products. The indicator was developed by Mr. Peterson

Your Best Subcontracting Bet: Automakers

THE AUTOMOTIVE industry continues to be a promising source of subcontracts under the defense program, in view of the numerous big prime contracts the automakers are receiving.

J. J. Cronin, vice president, General Motors Corp., said Fisher Body Division will begin work immediately to put the Grand Blanc, Mich., tank arsenal in shape to produce tanks under a $195 million contract from the Army. Kaiser-Frazer completed negotiations with the Air Force for production of the Fairchild C-119 at Willow Run. K-F's defense commitments now total over $500 million.

One successful subcontractor, A. O. Smith Corp., Milwaukee, announced it is beginning tooling to make landing gear for the Air Force's B-47 jet bomber. The company has a subcontract from Boeing Airplane Co., Wichita, Kans. Production is scheduled for a plant leased from the Air Force at Toledo, O.

To aid metalworking companies looking for subcontracts, STEEL presents another selected list of prime contract awards:

Product	Quantity	Value	Contractor
Repair Parts, (pumps)	20,065	$584,111	Buffalo Pumps Inc., Buffalo
Compass Indicators	1,147	1,577,461	General Electric Co., Philadelphia
Oil Burners	43,790	251,445	United Stove Co., Ypsilanti, Mich.
	25,000	169,960	Lanergan Mfg. Co., Albion, Mich.
Stove Valves & Floats	61,202	380,249	A-P Controls Corp., Milwaukee
Dump Trucks		3,730,508	Reo Motors Corp., Lansing, Mich.
Trucks (various)	3,984	14,770,000	Reo Motors Corp., Lansing, Mich.
Disks	32,000	634,160	Motor Wheel Corp., Lansing, Mich.
Busses	1,650	19,617,000	Twin Coach Co., Kent, O.
	435	5,750,265	ACF-Brill Motors Co., Philadelphia
		11,554,200	GMC Truck & Coach Div., Pontiac, Mich.
Automobiles		845,695	Chevrolet Motor Div., Detroit
Switch-Instruments	200,000	518,000	Zaiger Corp., Lynn, Mass.
Gages, Conduits, etc.		648,719	Food Machinery & Chemical Corp., San Jose, Calif.
Distillation Units	50	487,465	Cleaver Brooks Co., Milwaukee
Reperforator Sets (TC 18)	500	322,000	Haspeth Radio & Telephone Corp., Brooklyn, N. Y.
Mountings (MT 297 GR)	6,380	400,000	Hurlitzer Co., N. Tonawanda, N. Y.
Radio Sets	1,747	400,000	Hoffman Radio Corp., Los Angeles
	1,917	750,000	Collins Radio Corp., Cedar Rapids, Iowa
	2 lots	800,000	Hallicrafters Co., Chicago
Radio Transmitters	126	200,000	Transmitter Equipment Mfg. Co., New York
Radio-Terminal Sets	130	200,000	Hallicrafters Co., Chicago
	370	400,000	Kapey Mfg. Co., New York
Control Sets	7,077	200,000	Gray Mfg. Co., Hartford, Conn.
Power Units	3,966	475,000	Kohler Co., Kohler, Wis.
	1,560	235,000	Universal Motor Co., Oshkosh, Wis.
Central Office Equipment	various	860,974	Automatic Sales Corp., Chicago
Trucks, 2½ ton—telephone construction	314	600,000	J. M. Holden Corp., Cleveland
	400	800,000	McCabe-Powers Auto Co., St. Louis
Percussion Primers	14,463	561,842	Eagle Lock Co., Terryville, Conn.
Oscilloscopes	350	200,000	Allen B. Dumont Laboratories, Clifton, N. J.
Pumps (vertical & horizontal)	88	350,000	De Laval Steam Turbine Co., Trenton, N. J.
Compass Indicators (G2)	1,147	1,577,461	General Electric Co., Philadelphia
Auxiliary Power Units	77	1,848,000	Garrett Corp., Los Angeles
Hydraulic Catapults	2 lots	977,000	Baldwin-Lima-Hamilton Corp., Philadelphia
Gas Turbine Compressors	196	3,160,000	Research Mfg. Co., Los Angeles
Ring & Disk Rocket Units	1,920,000	1,630,464	Vibradamp Corp., Los Angeles

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to U. S. Commerce Department, Division of Printing Services, attention E. E. Vivian, Room 6225, Commerce Bldg., Washington 25. For ESA orders, write J. L. Miller, Economic Stabilization Agency, Room H367, Temporary E Bldg., Washington 25.

Materials Orders

SOLE LEATHER—Amendment of Mar. 8, 1951, to NPA Order M-34 widens group permitted to buy leather whole stock.

OIL WELL SUPPLIES—M-46 sets up rules under which priorities assistance is made available to petroleum and gas well drillers to obtain a monthly average of 157,000 tons of steel casing, tubing and drill pipe for drilling wells at a rate of 43,400 a year. NPA will issue directives to steel mills to provide steel for the program. Effective immediately, drillers are permitted to issue priority rating DO-97 to obtain maintenance, repair and operating supplies and laboratory equipment. Effective Apr. 1 drillers will be permitted to use a DO-48E to obtain steel casing, tubing and drill pipe for emergency purposes. Effective July 1 drillers will be permitted to use a DO-48 to obtain steel casing, tubing and drill pipe for normal operating equipment.

BISMUTH—M-48 stipulates that on and after Apr. 1 bismuth metal and alloys can be used only for certain essential purposes named in that order. Bismuth producers are required to accept rated orders for shipment in any one month of bismuth metal, alloys or products up to 50 per cent of their scheduled production. Bismuth dealers are required to accept such rated orders up to 25 per cent of the amount available to them, including inventory. The order also establishes a set-aside reserve, which is to be drawn upon only with authority from the NPA. To build up this reserve, producers and importers are required each month to set aside 20 per cent of their bismuth metal. Bismuth is used for making precision dies, bearing metals, low-melting-point alloys and solders, tempering baths for steel, pharmaceuticals, dental amalgams and for other purposes.

TIN CANS—Direction 1 to NPA Order M-25 provides a means by which canners of food and other products can increase their pack in certain cases where undue hardship would result under present base period provisions of the order. Direction 1 is effective Mar. 12, 1951.

TIN—Amendment of Mar. 12, 1951, to NPA Order M-8 places all domestic users of pig tin under allocation control May 1, permits tin plate and terne plate manufacturers to increase in the second quarter of 1951 their use of pig tin to 95 per cent of their monthly base period use, and designates the Reconstruction Finance Corp. as the sole importer of tin into this country on and after Mar. 12, 1951. The increase of pig tin to tin plate and terne plate makers is aimed at assuring cans for the spring and summer food pack. NPA indicated the percentages of permitted use of tin would be dropped back to about 80 per cent or less in the third quarter.

COPPER, COPPER-BASE ALLOYS—Direction 1 to NPA Order M-12 permits companies that were shut down more than 15 consecutive days in the first half of 1950 to make automatic adjustments in their base-period consumption of copper and coper-base alloys. Direction 1 is effective Mar. 14, 1951.

Delegations

Amendment of Mar. 14, 1951, to NPA Delegation 7 empowers 11 additional field offices of the U. S. Department of Commerce to act on applications for authorization to commence commercial construction. Previously, 18 field offices acted on applications.

Wage Regulations

Amendment 1 to General Wage Regulation 8 allows cost-of-living adjustments called for in noncollective bargaining situations where a written wage or salary plan was formally determined and communicated to the employees on or before Jan. 25, 1951. The amendment also permits approval of escalator clauses based on recognized indices other than the cost-of-living index figure published by the U. S. Bureau of Labor Statistics. The amendment was issued Mar. 8, 1951.

General Wage Regulation 9 issued Mar. 8, 1951, provides for establishment of wage schedules in new plants.

General Wage Regulation 10 issued Mar. 8, 1951, permits completion of tandem wage adjustments in process before Jan. 25, 1951, but which had not been completed for all employees normally covered before the freeze order was issued.

NEA

EXPENDABLE: Testifying before the Senate Small Business committee on industrial manpower policy, Selective Service Director Louis B. Hershey said that he doubted if men in the 19 to 26 age group have such skills that their removal from industry would "cause much of a ripple"

NE Mill Gets Setbacks

Chances for New London project dim, after market and engineering reports are withdrawn

BIRTHING pains of New England's $250 million integrated steel plant are severe and may prove fatal.

Two weeks ago, prospects for the mill appeared bright. It had a certificate of necessity from the federal government. A large established company held an option to build and operate the mill. It had the enthusiastic backing of New England metalworking companies who keenly felt the penalty in freight rates which they paid for imported steel. Steps were being taken to acquire a site.

Came the Storm—Then came these unfavorable developments: Market and engineering reports, made by Coverdale & Colpitts, were withdrawn on the eve of publication. In part these were unfavorable to the New England steel mill project. They questioned the ability of the New England steel mill to compete for the New York-New Jersey market with new mills to be built at Morrisville, Pa., and Paulsboro, N. J. They questioned the size of the New England market to be served by the New London mill. They suggested obtaining raw materials, especially iron ore, at competitive prices might be difficult.

The engineers are drafting a more favorable report on the basis of new information, but the withdrawn report already has damaged the mill's chances.

Bethlehem Withdraws—Following withdrawal of the reports, Bethlehem Steel Co. dropped negotiations to build the mill. The New England mill backers are attempting to interest other established mills in building and operating the mill.

Opposition to acquisition of the site developed. Residents of the area object to the state delegating rights of eminent domain to acquire land on which to build the mill.

Windows of Washington

By E. C. KREUTZBERG Washington Editor

EXPORT-IMPORT PICTURE
. . . more coming than going

OBSERVING ALUMINUM ORDERS?
. . . FTC will find out

ARMY GOES TO WORK
. . . on $12 million research lab

SMALL BUSINESS ENCOURAGEMENT
. . . a pat from Senator Humphrey

We're Having a Rip Tide . . .

Government foreign trade officials who worried about the big excess of our exports over our imports in the post-World War II period are wondering now if the tide is washing in too much. January imports came to $1022.3 million, a new high record. Exports in that month were $972.3 million. The reversal resulted from big imports of vegetable food products, beverages, inedible vegetable products and textile fibers and manufactures. Imports of metals and their manufactures dropped from $146.4 million in December to $137.6 million in January. Only fabricated metal imports that moved up were machinery and vehicles; imports of these items rose from $15.3 million in December to $18.1 million in January.

Policing Aluminum Users . . .

Are you observing the aluminum order of the National Production Authority? Federal Trade Commission's new Division of Defense Surveys will be calling on you to find out. At the request of the NPA, 60 FTC field men will survey some 300 aluminum fabricators to determine their knowledge of NPA regulations and the extent to which orders and regulations are heeded. Findings will be reported to the NPA which then will map out a course of action if necessary.

Army Research at Natick . . .

The $11 million research laboratory of the Army Quartermaster General, to be built at Natick, Mass., will subject to developmental studies thousands of fabricated metal products. Maj. Gen. Herman Feldman says it will have these facilities of interest to metalworking industries:

Materials Handling Equipment Laboratory — to concentrate immediately on developing fork-type lift trucks with lateral movement of forks, hydraulic driven extension masts and other features for performing specific military materials handling chores.

Fabrication Unit — a completely equipped metalworking shop to make and modify experimental metal items.

Testing Laboratory — to determine such characteristics as tensile strength, impact resistance, abrasion resistance, hardness, etc.

Cooking, Baking & Heating Equipment Laboratory — to develop units of maximum efficiency, minimum fuel consumption, and lightness of weight for movement by air.

Tools, Hardware & Miscellaneous Equipment Laboratory — to determine correct designs for minimum operator fatigue and to select steels that will not fracture at minus 60 degrees Fahrenheit.

The new laboratory will bring together facilities now at Washington, Philadelphia, Jeffersonville, Ind., and Lawrence, Mass. The custom of having outside firms and institutions do research and development work will be continued, says General Feldman. About 150 such contracts now are active.

Fair Deal for Little Fellow . . .

Charging that NPA orders "sign the death sentence for thousands of small firms," and that small companies always "get pushed to the end of the procurement line," Sen. Hubert H. Humphrey introduced a bill to create an independent Office of Small Business Defense Production. It would be this agency's responsibility to determine the best way of utilizing small business facilities during the emergency, and to insure fair treatment of small firms by the procurement agencies.

Disposing of Wastes . . .

Included in water pollution grants of more than $900,000 by the Public Health Service for fiscal 1951 is one of $11,040 to encourage the state of Ohio to continue its studies in disposing of electroplating wastes so as to minimize toxic discharges into streams.

Situation Well In Hand?

In conversation with a group of presidential advisers, a prominent industrialist associated with a dozen or more companies in the Middle West was asked what he would suggest doing in connection with the Pittsburgh-area railroad strike. Said he, "Well, the Army is supposed to have taken over the railroads, so maybe it would be well to have the marines take over the Army." One adviser observed the suggestion was at least original, and the only one he had received up to that time.

New Ships and Old . . .

The naval shipbuilding bill signed by President Truman Mar. 11 provides for construction of new vessels and conversion of existing vessels. The new units include one aircraft carrier, 22 minesweepers, 32 minesweeper type vessels, seven submarines, two ocean escorts, 17 fleet tankers, two rocket ships, one icebreaker, 66 landing ships and 60 smaller vessels of various types.

The Ferrous Scrap Supply . . .

"Great concern" are the words used by NPA officials in describing their state of mind about ferrous scrap supply. A number of courses of action are under study. It is likely that domestic scrap drives will be launched this spring. Foreign sources again are under study. In particular, a plan of bringing back battlefield scrap from Korea is in the works.

You Must Have a License . . .

You no longer may use your judgment in supplying catalogs, drawings and other technical information to customers in Iron Curtain countries. The former voluntary system was replaced with mandatory controls. You must now get a license from the Office of International Trade, Commerce Department, before you can send technical information to Iron Curtain destinations.

Europe Doesn't Expect War This Year

Industrialists note a slackening in the sensitive export markets as scare buying eases. But industrial production continues at high level

WESTERN EUROPEAN industrialists don't expect World War III this year.

A sellers' market for many industrial exports is slowly disappearing. German export firms are again finding stiffened competition from other countries in various commodities. Germans expect a general decline on global markets and a slackening of production all over the world.

Still Brisk—That doesn't mean that industrial production is still not at a high rate. It is, but the sensitive export market reflects a change in war thinking. In the fourth quarter of 1950, the latest period for which firm statistics are available, industrial production in Marshall Plan countries was 40 per cent above the 1938 levels. ECA estimates that output during the first six months of 1951 will be 12 per cent above production in the first half of 1950. But that would be a drop from the rate of gain achieved in the final three months of 1950, when production was 16 per cent above that for the same 1949 period.

During the last three months of 1950, Western Europe's steel production hit the highest quarterly total on record with an average monthly output of 4,950,000 net tons. General export volume was also at a postwar high in the final 1950 quarter, almost 60 per cent greater than in 1938. Intra-European trade was at a peak. Fourth quarter 1950 volume was almost 40 per cent greater than in the final quarter of 1949.

The Borders Fall—Integration of European steel and coal industries is nearer. Some major stumbling blocks in implementation of the Schuman Plan have nearly been removed. It has been agreed to permit the German steel firms to get up to 75 per cent of their coal and coke from captive mines. The French had held out for a thorough breakup of the coal-steel integration. The Germans have agreed to dissolve or at least reorganize the central coal sales agency, the Kohlenverkaufssyndikat, within three years. Under the Schuman Plan, the International Ruhr Authority will be abandoned not later than September, 1951.

The Belgians still have complaints about the Schuman setup, especially over what they consider as excessive power for the High Authority which will administer the program, but chances are good for approval by representatives meeting on the matter in Paris. Once approved by those representatives, the plan goes to the parliaments of the countries involved.

France Supplies Steel Units

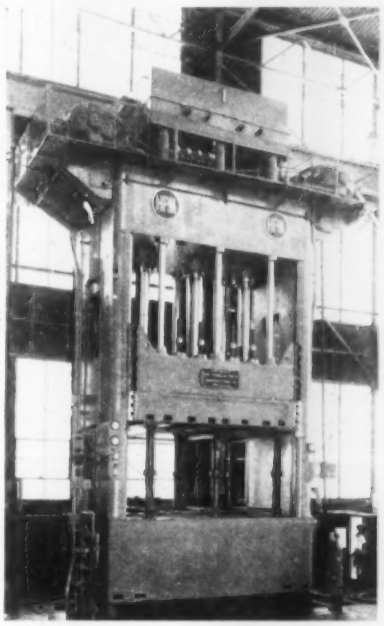
France will build $25 million worth of steel mill equipment for Colombia and $12 million worth of equipment for Peru. The Colombian plant in the Paz De Rio area 230 miles from Bogota will have a capacity of 100,000 tons a year. The Peruvian plant will be built at Chimbote, 350 miles north of Lima.

Those are the largest foreign steel equipment orders placed in France since the end of World War II. They are doubly important because the contracts will give France needed dollars.

Ruhr Expansions Rise

The German steel industry intends to invest $72 million this year on new plants and equipment, but claims it should spend $120 million. Not enough capital is available for the full expansion, nor does adequate capacity exist in Germany to build the rolling, forging and other equipment necessary for a full program.

The Ruhr's ingot production in February was only 1,035,000 net tons, compared with 1,146,000 tons in January. Steel prices will be raised shortly, partly because the prices of Swedish iron ores are going up. If finished steel increases 10 or 15 marks per metric ton, Ruhr prices will surpass the British by 5 to 10 per cent.



FOR EXPORT: This large bed area 800-ton blankholder press is first of two scheduled for shipment abroad by Hydraulic Press Mfg. Co., Mt. Gilead, O. Having overall height of 36 feet and weight in excess of 260 tons, it will be used in France to stamp automobile parts

Belgian Markets Calm Down

The Belgian domestic market for steel is quieting down after the frenzied buying in the second half of 1950.

Despite heavy steel purchases in Belgium and Luxemburg, shipments by steel consumers in 1950 were still slightly less than in 1949 and considerably less than in 1948.

British Steel Prices Increase

British iron and steel prices have gone up for the first time since April, 1949. The increase is the first major act by the new Iron & Steel Corp. that controls the nationalized industry, but a boost would have been necessary whether steel companies had been publicly or privately owned.

The advances average about 3 per cent, and even now British steel quotations in most cases are below those on the continent and in the U. S. The increase is not likely to interfere with the normal flow of business as the consumer's main interest is to obtain materials.

Rearmament contracts are awaited by many firms. Relatively few orders have yet been placed with steelmakers although their order books are congested with other business. Machine tool and engineering industries are the most active among steel consumers. Auto producers have had to cut production to fit in with the allocations of sheet steel.

The steel expansion program announced for all British steel firms is now about half finished. One of the most important projects, for Steel Co. of Wales, is being completed now, and a new sheet plant will be operating by the end of this year.

Ingot production in January, the last full month of private ownership reached a record high of 17,815,840 net tons, compared with 17,777,760 tons a year earlier. Total exports of finished steel in 1950 was 2,352,000 tons. It's unlikely that the figure can be reached in 1951.

Westinghouse Rearms

$42 million will be spent for expanded facilities. One-third of output will be military

MORE THAN 35 per cent of Westinghouse Electric Corp.'s unfilled orders are for direct military needs, and the company expects over one-third of all production this year will be for the rearmament program.

To meet these requirements and those of expanding industrial manufacturers, Westinghouse will spend $42 million this year for additional facilities. Scheduled for increases are electronic tubes, aircraft armament systems, small motors, micarta, lamps and generator manufacturing divisions.

Now in production for the military are radar-directed rocket firing devices, automatic pilots and improved turbojet engines. Westinghouse is engaged in several phases of atomic research, including development of an atomic power plant for submarine propulsion.

Westinghouse Tube Picks Elmira

A 100-acre tract near Elmira, N. Y., will be the site for the headquarters plant and engineering laboratories of Westinghouse Electric Corp.'s new Electronic Tube division. Scheduled for completion by early fall, the plant will contain two complete factories set up in a one-story building containing approximately eight acres of manufacturing space and a two-story administrative and laboratory building.

Tracerlab & Kelly-Koett Merge

Two groups in the closely related fields of radiology and nucleonics have been brought together. Now consolidated are Tracerlab Inc., Boston, and Kelly-Koett Mfg. Co. of Covington, Ky., and Cincinnati. Both companies have substantial contracts for critical nuclear instruments. Operation of both firms will be continued under present management.

Adds Refractory Facilities

First phases of a $12 million expansion and building program are being entered by General Refractories Co., Philadelphia. Projects include expansion of silica brick manufacturing facilities, a new plant for making unburned basic refractories in Los Angeles that will double West Coast capacity, and modernization of the Baltimore basic brick works to increase that plant's capacity by 25 per cent.

DEBUT: The first scraper off the assembly line undergoes final adjustments at the new Joliet, Ill., plant of Caterpillar Tractor Co. Less than a year ago the site was 300 acres of unimproved land. While production is being started, parts of the 750,000 square foot structure are still being fitted with machine tools

Peoria Plant Under Way

A new die and fixture building for Caterpillar Tractor Co. is under way in Peoria, Ill. Slated for completion early in 1952, the structure will contain approximately 166,000 square feet of floor space. Chief use will be for storage and repair of heavy dies and fixtures used in Caterpillar's steel fabrication plant.

Freight Car Parts Backlogged

Business is good in the railroad freight car parts field. Standard Railway Equipment Mfg. Co., Chicago, reports that current unfilled orders are ten times greater than those of a year ago. Action is being accelerated on a $2.5 million improvement and expansion program at Standard's Hammond, Ind., plant.

Foster Midway in Expansion

The half-way point on a $1 million expansion program has been reached by L. B. Foster Co., Pittsburgh, suppliers of railroad trackage, steel sheet piling and pipe. Undergoing extensions are facilities in Chicago; Houston; Carnegie, Pa.; Delawanna, N. J.; and Amsterdam, N. Y.

Kaiser To Sell Commercial Coal

Heralding an entry into the commercial coal business by Kaiser Steel Corp. is the merger of the Utah Fuel Co., Salt Lake City, with the parent corporation. Originally purchased a year ago to supply Kaiser's Fontana, Calif., mill, Utah Fuel will operate as a fuel division and is expected to step up the marketing tempo of commercial coal.

Blaw-Knox Builds Gas Systems

Chemical Plants division of Blaw-Knox Co., Pittsburgh, is building ammonia storage and handling systems for Crucible Steel Co. of America, Pittsburgh, and for Wean Engineering Co., Warren, O. The systems include facilities for transfer of tank-car quantities. Blaw-Knox is also supplying Wean with a 30,000 cubic foot nitrogen standby pressure storage system.

Du Pont Explosives Plant Sited

Construction of a new commercial explosives plant near Martinsburg, W. Va., and major expansion of its Repauno plant at Gibbstown, N. J., are being undertaken by E. I. du Pont de Nemours & Co. Chemical manufacturing facilities at Repauno will be used for production of DMT, principal raw material for manufacture of Du Pont's new synthetic textile fiber.

More Sandsteel Springs Planned

Enlargement of its industrial spring activities to keep pace with accelerated watch mainspring manufacture is planned by Sandvik Steel Inc.'s Sandsteel Spring Division. Springs will be made for instruments, motors, cameras, timing devices and similar equipment.

Enamelers Study Substitutes

Seventeen companies, representing a major segment of the country's manufacturers of porcelain-enameled steel products, co-operatively have undertaken a research program to find protective ceramic coatings prepared from nonstrategic materials.

Battelle Memorial Institute, Columbus, O., has been retained to provide a scientific basis to pave the way for improved porcelain enamels and acceptable substitutes for materials now used.

Sessions Clock Buys Tyniswitch

The Sessions Clock Co., Forestville, Conn., has purchased Tyniswitch Inc., Middletown, Conn., manufacturer of snap-action miniature switches. The acquisition will operate as Tyniswitch division, with manufacturing facilities located in Forestville.

North American Forms Division

Formation of an Electro-Mechanical division puts North American Aviation Inc. into the field of manufacture of electronic equipment. Headed by L. L. Waite, vice president and director of the company's Aerophysics laboratory, the division will design, develop and manufacture electronic components and complete guidance control systems for missiles and aircraft.

For the last several years North American has been active in both guided missile and atomic energy research in its Aerophysics laboratory. With the new division the company will manufacture as well as design in electronics.

Six new facilities containing 273,000 square feet have been leased in Los Angeles by the company for manufacturing, engineering, flight test and other activities.

Manufacturing will take up three of the newly-acquired buildings. Two new hangars totaling 90,000 square feet will be built by the City of Los Angeles for lease by North American.

Convair Makes Guided Missiles

Consolidated Vultee Aircraft Corp., San Diego, has started mass production of radio-guided missiles, at a new 200,000 square foot plant in San Diego. To employ 1500 workers, the new Convair plant will first tackle a project for the Navy's Bureau of Ordnance: Production of supersonic anti-aircraft missiles.

Hughes Aircraft Co. recently announced it will center production of guided missiles at a plant to be constructed at Tucson, Ariz.

Lockheed Builds in Burbank

Lockheed Aircraft Co. is beginning construction in Burbank, Calif., of a five-story $2 million building to centralize departmental activities. It will contain 165,000 square feet and have a bombproof basement. Pending completion early in 1952, Lockheed will add to its leased facilities to free more manufacturing area for expanded production.

'Help,' Machinery Makers Plead

"Give us help," was the plea of the Woodworking Machinery Manufacturers Industry Advisory Committee to the National Production Authority. "Some of the materials required to manufacture our products are hard to get; some are unavailable," they said.

In making their plea, the committee members asked that their industry be recognized as a leading claimant for scarce strategic materials. NPA pointed out that no exemptions have been granted from materials conservation orders but that procedures have been established whereby assistance will be given individual manufacturers whose inability to obtain materials to fill their orders is causing undue hardship. It was suggested to the committee that information be submitted on the entire industry's estimated future requirements so that the estimates may be weighed against supplies in considering any NPA action.

Types of machinery manufactured by the woodworking machinery industry include clamps, glue spreaders, power feed attachments for hand planers, laminating presses, planers, band and circular saws, saw tables, lathes, carvers, splicers and routing machines.

Tool Standardization Defended

Report in STEEL of Feb. 19, p. 47, that there will not be universal welcome for a National Production Authority order establishing standardized types and varieties of hand tools brings a rejoinder from one hand service tools producer who favors such an order.

He says: "Members of the Service Tools Institute, which represents a substantial majority of all mechanics' hand tool manufacturers in this country, have been working for many years on a program of standardization and simplification in conjunction with the United States Bureau of Standards; it is generally recognized that this activity has saved manufacturers, distributors and consumers many thousands of dollars over the years.

"An overwhelmingly large proportion of all manufacturers have been enthusiastically behind this program and its introduction into NPA discussions came primarily as a part of a program to conserve material and manpower under present conditions.

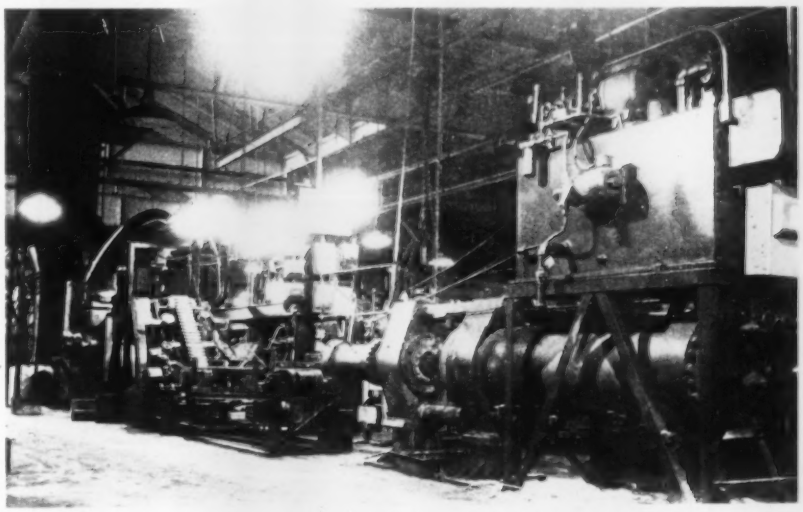
"While excellent progress in simplification and standardization has been made on a purely advisory and voluntary basis, it is now possible that the goals of the program may be attained even more quickly under NPA regulations.

"The whole program," he asserts, "is simply one to eliminate duplications of tools doing the same job.

"There undoubtedly are, and will be, further differences of opinion," he admits, "as to the finishes that are to be put on tools under present conditions. While all of us would like to add to the salability of our products by giving them more eye-appeal, we do recognize that when manpower and materials are as scarce as they are, and the demand for our products as high as it is, the proper thing to do is to comply with regulations which clearly are for the benefit of the country as a whole," he believes.

Black & Decker Plant Started

Ground has been broken at Hampstead, Md., for a new 100,000-square foot branch plant of Black & Decker Mfg. Co., Towson, Md. To be in operation by spring of 1952, the new facility will make portable electric tools.



ELECTRODE EXPANSION: These two presses are additions by Eutectic Welding Alloys Corp., Flushing, N. Y., to expand welding electrode production. The presses have been synchronized on one four-level drying tunnel in the Eutectic production line

Now, more than ever before, America must make full use of its steel-making capacity and conserve its natural resources. Now, more than ever, there is national significance in the phrases, "*Make a ton of sheet steel go farther*" and "*Make your product last longer.*"

These low-alloy, high-tensile steels do "make a ton of sheet steel go farther"—for their inherently higher strength is 50% greater than mild carbon steel. That means, in turn, that 25% less section can be used with safety, and where rigidity is important, this can usually be compensated for through slight design change.

"Make your product last longer" is no idle claim. The much greater resistance of N-A-X HIGH-TENSILE to corrosion, abrasion, and fatigue assures longer lasting products even at reduced thickness.

Explore the potential economies to be derived from the use of low-alloy, high-strength steels—and then specify them. Their use can add materially to our national conservation program.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division, Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor, STEEL*

Mirrors of Motordom

Williams of Ford thinks it unlikely that civilian auto production will be entirely cut off again even under the most serious emergency conditions

DETROIT

CATCH PHRASES don't help much in producing cars or armaments, but they do help develop awareness in the public of the auto industry's dual role. One of the most clever combinations of words for this purpose came last week from J. F. Wolfram, Oldsmobile general manager. He said "Our job is to supply firepower and horsepower, bazooka rockets to fire at a stubborn enemy and 135-horsepower Rockets for installation in our 1951 models."

On Understanding — The requirements of a garrison state economy are better understood by automakers than they are by many of the industry's suppliers, by a good many people in government and by a large segment of the public.

It doesn't take much scouting around to find people who can't understand why the auto industry is not forced to convert in toto to war materiel production. It is even easier to locate people who consider continued use of scarce materials, plant capacity and manpower for production of automobiles a jeopardy to the security of this country. Obviously the automakers do not agree.

What, basically, is overlooked by people of such a turn of mind is that the state of tension and threat of full-scale war may be with us for a decade or longer. During that period a different kind of war—one to capture men's minds—will actually be in progress. To win the latter war requires the tangible products of the civilian goods industries. It is easier for our government's propagandists to use these products as proof of the superiority of the capitalistic system than it was for Nazi Germany, for example, to obtain co-operation on the promise of Volkswagen in every garage as soon as the world was conquered.

Geared for Transportation—Walker A. Williams, Ford vice president in charge of sales and advertising, stated his views on an auto company's part in the business-not-as-usual type of economy. He warned that a defense effort, creating as it does the need for controls, allocations, artificial restraints and unpredictable decisions by a few controllers, can have "a profound effect on the business and social organizations of our country." This country's economy is geared to availability of automobile transportation. Proving it by citing statistics that show dependence of workers on private cars, the trend toward social and industrail decentralization and the importance of the industry to the economy. Mr. Williams comments, "In view of all these circumstances it seems to me unlikely that civilian automobile and truck production will be entirely cut off again even under the most serious emergeney conditions. The logistics of the home front—Operation Keep Rolling—requires the production of trucks and passenger cars, or so it seems to me. You cannot manage a managed economy in America without automobiles."

Once Again Up—What Mr. Williams feels is likely to happen if automobile and other civilian goods production is allowed to continue although on curtailed schedules is that during the next two years defense production will achieve desired rates, then "barring a third world war . . . with defense schedules met and essential materials stockpiled high, automobile production will once again be on the increase."

Auto, Truck Output

U. S. and Canada

	1951	1950
January	661,592	609,878
February	656,238*	505,593
March		610,680
April		585,705
May		732,161
June		897,853
July		746,801
August		842,335
September		760,847
October		796,010
November		633,874
December		671,622

Weekly Estimates

Week Ended	1951	1950
Feb. 17	177,932	123,712
Feb. 24	199,247	125,285
Mar. 3	177,356	124,072
Mar. 10	180,232	124,563
Mar. 17	185,000	134,453

Estimates by Ward's Automotive Reports

* Preliminary.

Auto Tax Increase Fought

Almost as calamitous to the industry and to the overall economy as a cease-production order would be the enactment of the proposal to increase the excise tax on automobiles. How serious the action would be was told last Tuesday to the House Ways & Means Committee by A. E. Barit, president of Hudson and chairman of the taxation committee of the Automobile Manufacturers Association. His committee is fighting the proposal that would increase the auto manufacturers' excise tax from 7 to 20 per cent.

The proposed increase, Mr. Barit contends, constitutes a grave threat not only to our business but to the general economy of the nation and the success of the taxation program itself. At some point any commodity can be taxed out of the market. If this should happen to automobiles, he thinks, their value as a revenue-producer ceases, the jobs of the nine million who are dependent on the industry are terminated, and the general economy collapses. Citing the tax load already in force on every new vehicle as 24 per cent of the purchase price, he points out that the federal excise tax is peanuts compared with other special taxes levied against owners of passenger cars.

Chrysler Sums Up Defense Work

Ford and General Motors having wrapped up the sum and substance of their respective defense orders to date (STEEL, Mar. 12, p. 66), the other member of the Big Three, Chrysler, last week told its stockholders in capsule form what it had been called on to do defense-wise. Assignments to date are Dodge Army trucks, medium and other unspecified types of tanks, tank engines, jet aircraft engines, range finders, submarine indicator nets and searchlight reflectors.

General contract for the main manufacturing building at Newark, Del., where tanks will be built, was awarded recently to H. K. Ferguson Co. Inc. Work on the foundation has already begun. This plant, adjacent to a Chrysler parts plant, will contain more than 1 million square feet, the

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manufacturing space measuring 600 x 1700 feet. A two-story office building will front this structure while a mile-long test track will be on its west side.

Fisher in Tank Picture

Fisher Body Division of GM will also re-enter the tank production picture; it got an Army contract estimated at $195 million. Unlike the Ford and Chrysler commitments (they require the building of new plants) the Fisher tank will be produced in the Grand Blanc, Mich., tank arsenal which Fisher operated during World War II. It was used by Buick for the last five years as a master parts warehouse. Now stored in the plant are 1700 truckloads of parts. Moving them to Flint and to Detroit will take two to three months.

Just how long will be required before Grand Blanc will figure as a tank producer is not known. "No time will be lost in starting fabrication of jigs and fixtures and in placing orders with outside suppliers," says J. J. Cronin, GM vice president and general manager of the autobuilding division.

New manager of the plant will be Sidney J. Sabourin. He served as assistant manager in 1944 and as acting manager in 1945. He has been resident plant manager of the Hamilton, O., Fisher Body plant.

Bart Cotter, presently assistant chief engineer of the Central Engineering Division in Detroit, will move to Grand Blanc as chief engineer.

Packets at Willow Run

Kaiser-Frazer formalized its arrangement for building Kaisers and Henry J's alongside of Fairchild Packets at Willow Run (STEEL, Mar. 12, p. 66). About a million square feet or one-third of the plant's mammoth floor space, will be devoted to the Packet. Major physical changes necessitated for the conversion include removal of inside railway shipping docks; relocation of machine shops, rerouting of paint spray lines and construction of body trim lines.

Over 20 carloads of machine tools and other production equipment, demothballed from Air Force stocks, are ready for installation when the space is cleared. Other equipment required by subcontractors is being delivered.

Major subcontractors are Murray Body Corp., Detroit, which will build the tail booms, dorsal fins and doors; Gibson Refrigerator Co., Greenville, Mich., which will supply cargo floors, ailerons, empennage and other interior parts; Whirlpool Corp., St. Joseph, Mich., which will construct wings, wing tips and outboard flaps; and Willys-Overland Motors Inc., Toledo, which will provide all landing gear.

Rearrangement of the auto assembly lines will begin Mar. 26 when Willow Run goes to a two-shift schedule. Car output is calculated at 450 a shift, 900 a day. K-F's employment of more than 11,000 is expected to be increased by 5000 to 8000 as the C-119 program takes shape.

Tests Widen Boron Uses

Auto and truck companies are finding some boron-treated steels satisfactory for certain applications as substitutes for scarce alloys. One truck maker reports 43B17 proved satisfactory when substituted for 4820 in heavy duty counter shafts over a five-year trial period. The company produced 50 tons of carburized parts using this boron steel.

Boron-treated grade 94B20 is now used to replace 4620 by a manufacturer of small hypoid gears, and is being tested for use in 15-inch ring gears. A third boron grade, 43B10, has been used to replace 9310 in a variety of applications.

Tests by automotive and allied companies will soon show whether 86B15 can be used to replace 4820. Future projects include testing boron-containing grades 86B17, 86B15, 94B17, 80B20 and 46B17.

One Quick Way of Counting

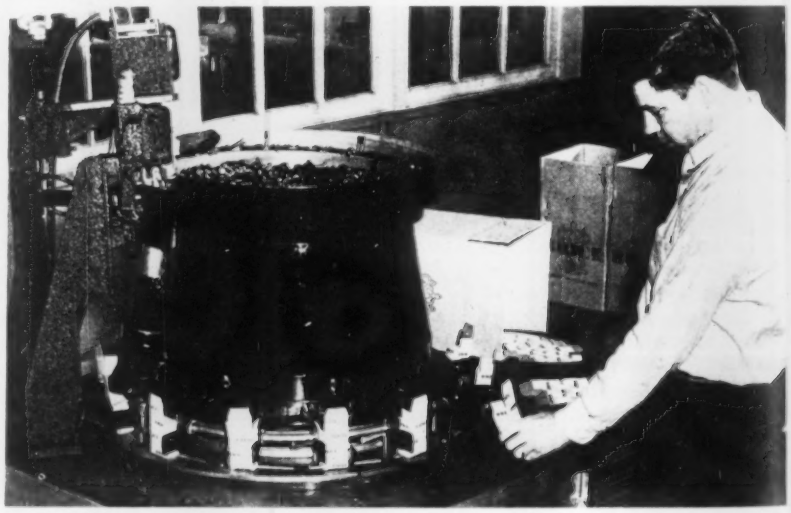
An electronic packager, capable of counting and packaging up to 13,000 small pieces an hour, is relieving men at the main Buick parts warehouse in Flint, Mich., of the tedious job of counting these parts. Able to handle nuts, bolts, washers, etc., whether, made of metal, fiber, plastic or what-have-you, the machine consists of a vibratory feeder coupled with an electronic counter. The feeder is vibrated by an electromagnetic impulse which forces the parts to climb a ramp that encircles the interior. The parts are counted by an electric eye as they move in single file before dropping into a chute to the carton. When the desired number has been counted—and the machine can be set at from 1 to 1000 parts—the vibration stops.

Auto Scrap Rate 'Way Up

Automobiles and trucks were scrapped in 1950 at a rate nearly 50 per cent above the 26-year average. A calculated total of 2,315,110 passenger cars and 527,441 trucks went off the road last year compared with average yearly addition of 1,629,370 cars and 269,305 trucks to the junkheap. In 1949 1,220,011 cars and 484,038 trucks were scrapped. These statistics were compiled by R. L. Polk & Co., Detroit.

New registrations over the past 26 years have averaged less than the number of vehicles scrapped last year. For cars this average is 2,311,765, and for trucks 458,921 units.

Percentagewise, car scrappage in 1950 amounted to 36.6 per cent of new registrations and 5.8 per cent of all cars in use. Trucks scrapped represented 60.4 per cent of new registrations and 6.4 per cent of trucks in use.



WORK SAVER: Up to 13,000 small automobile parts can be counted and packaged in an hour by this machine installed at the Buick parts plant in Flint, Mich. Vibrations of the hopper force parts to climb a circular ramp past an electric eye which counts them. They then drop into chute which guides them into cartons. Operator need only load and unload cartons

The Business Trend

Industrial production pace is steady and strong and only slightly under postwar peak, but it was being threatened by work slowdowns by railroad employees

TODAY'S production indexes might well be called "busy" signals from industry. Nearly all of them indicate activity at or near peak levels. Consequently, strength and steadiness are reflected in STEEL's industrial production index for the week ended Mar. 10. It registered 222 per cent of the 1936-1939 average, up 1 point over the preceding week. This level is not far below the postwar peak recorded in the week ended Feb. 24. A year ago the index was only 171.

Boost from Autos . . .

The slight gain of the index in the week ended Mar. 10 came from increased production of automobiles. Output that week, says *Ward's Automotive Reports*, was 180,232 passenger cars and trucks, compared with 177,356 in the preceding week. This is still a good distance below the year's high mark of 199,267 produced in the week ended Feb. 24.

Nevertheless, March has been marked consistently with high enough output that a continuation of it through the rest of the month would make it the best auto production month since last October, when 760,000 vehicles were built. It appeared that March might yield 735,000.

Steel Output Pinched Down . . .

For the third week this year steel ingot production exceeded the 2-million-ton mark by totaling 2,019,000 net tons in the week ended Mar. 10. But it was to slip off to 2,001,000 tons in the week ended Mar. 17 because of a strike at a Pittsburgh steel mill. Most of the other mills in the country were scheduled to operate at or above theoretical capacity. A year ago the output of steel for ingots and castings was 1,711,800 tons.

Coal Production Up . . .

Among those operating at high levels is the bituminous coal industry. Its output of 11,120,000 net tons in the week ended Mar. 3 was the highest since 11,410,000 tons were turned out in the week ended Jan. 27, the National Coal Association reports. Production thus far this year is a little more than double that of the corresponding period of last year.

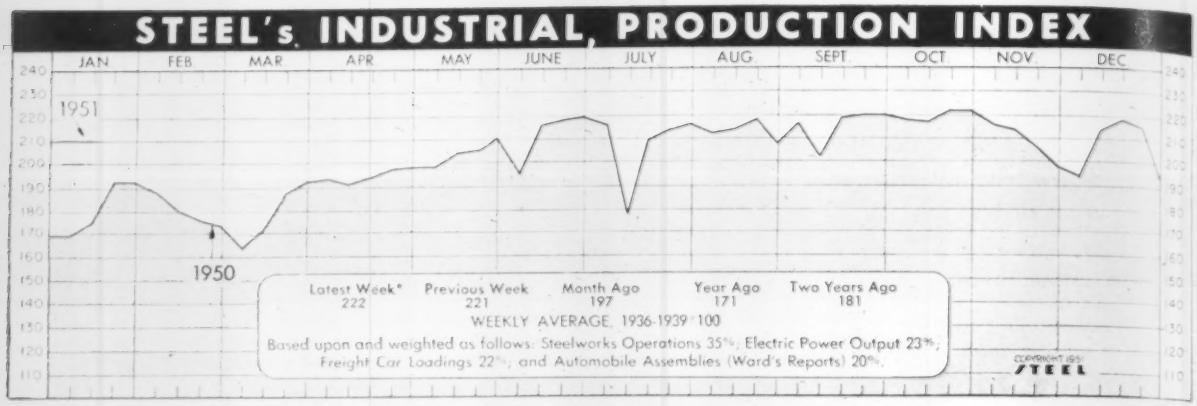
More Plants for Industry . . .

Industrial expansion continues to keep the awarding of contracts for industrial buildings at a high level. In the week ended Mar. 8 awards totaled $109.9 million, says *Engineering News-Record*. While that is 17 per cent below their average week to date this year, it is 490 per cent above the average week in the corresponding period of last year. Industrial building awards accounted for nearly half of all engineering construction awards for the week ended Mar. 8, the total awards amounting to $258.9 million.

Prices: Flying Higher . . .

Inflation continued onward and pushed the government's wholesale price index in the week ended Mar. 6 to a new record, 183.5 per cent of

BAROMETERS of BUSINESS		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.0	100.0	97.0	74.5
	Electric Power Distributed (million kilowatt hours)	6,795	6,822	6,957	5,937
	Bituminous Coal Production (daily av.—1000 tons)	1,853	1,675	1,569	530
	Petroleum Production (daily av.—1000 bbl)	6,047	6,016	5,861	4,827
	Construction Volume (ENR—Unit $1,000,000)	$258.9	$352.1	$555.7	$210.6
	Automobile and Truck Output (Ward's—number units)	180,232	177,356	116,020	124,563
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	775†	786	573	708
	Business Failures (Dun & Bradstreet, number)	153	170	191	221
	Currency in Circulation (in millions of dollars)‡	$27,219	$27,188	$27,125	$27,105
	Department Store Sales (changes from like wk. a yr. ago.)‡	+18%	+24%	+3%	0%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$17,220	$14,204	$15,450	$13,258
	Federal Gross Debt (billions)	$255.7	$256.0	$256.0	$255.9
	Bond Volume, NYSE (millions)	$20.1	$22.5	$23.6	$20.5
	Stocks Sales, NYSE (thousands of shares)	8,567	8,773	12,800	7,532
	Loans and Investments (billions)†	$69.5	$69.2	$69.5	$66.8
	United States Gov't. Obligations Held (millions)†	$30,791	$30,900	$31,504	$36,774
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.13
	STEEL's Nonferrous Metal Price Index‡	248.4	261.9	262.1	158.5
	All Commodities†	183.5	183.0	182.3	152.7
	Metals and Metal Products†	190.7	188.7	188.9	168.5
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				



*Week ended Mar. 10

the 1926 average. This new record followed a two-week leveling off after a long succession of record-breaking weeks. Before going up to 183.5, the index registered 183.0 in the week ended Feb. 27. All major groups, except building materials, showed price advances.

Record for Freight Cars . . .

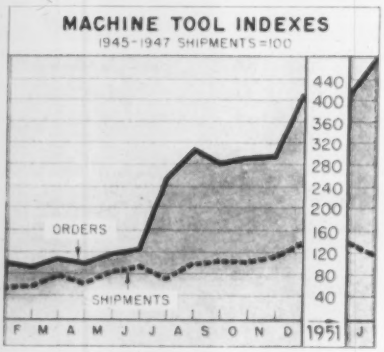
Ordering of 15,947 domestic freight cars in February put the backlog of orders for them to an alltime high, 154,861, on Mar. 1, says the American Railway Car Institute and the Association of American Railroads. The backlog was at an alltime high on Feb. 1, too, by totaling 144,758, following placement of orders in January for 26,356 cars.

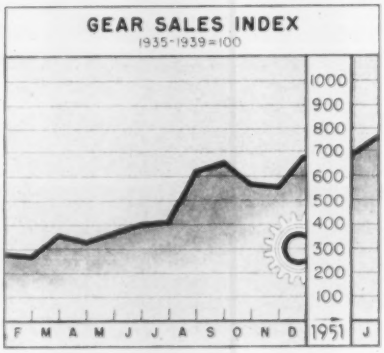
Delivered in February were 5842 new cars, compared with 5949 in January. Cars delivered in January and February were produced from steel rolled in the last quarter of 1950, before the present goal of 10,000 cars a month authorized by the National Production Authority became effective. As it takes from 60 to 90 days to ship finished steel to car building plants, to fabricate car parts from the steel and to assemble cars, it is not expected that the goal of 10,000 cars a month will be reached until after the allocations program has been in effect at least three months.

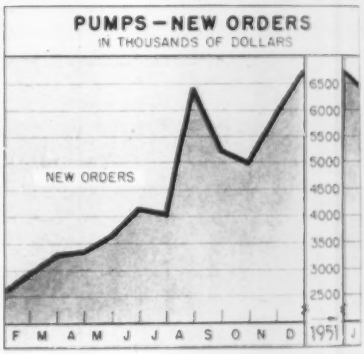
Reports from carbuilders and railroads show steadily increasing production schedules for March and April.

A Job for Everybody . . .

Expanding of the country's industry and the operation of much of that industry at peak levels are bringing about new employment records. In the week ended Feb. 10, for instance, civilian employment, esti-







Machine Tool Indexes

	New Orders 1951	New Orders 1950	Shipments 1951	Shipments 1950
Jan.	478.8	99.7	113.9	52.8
Feb.		86.2		56.1
Mar.		107.4		75.3
Apr.		98.9		61.6
May		116.4		82.5
June		124.1		91.9
July		253.1		68.3
Aug.		305.1		95.7
Sept.		280.6		101.6
Oct.		289.6		100.9
Nov.		291.9		110.9
Dec.		410.1		135.7

National Machine Tool Builders' Asso.

Gear Sales Index

1935—1939=100

	1951	1950	1949
January	764.6	280.2	320.7
February		272.9	282.3
March		358.4	299.1
April		328.6	339.0
May		363.1	250.1
June		401.0	227.8
July		410.7	193.1
August		617.4	262.0
September		654.5	224.9
October		564.8	242.3
November		554.9	230.7
December		680.4	242.8

American Gear Mfrs. Association

Pumps, New Orders

In Thousands of Dollars

	1951	1950	1949
Jan.	6,477	2,586	3,390
Feb.		2,938	3,247
Mar.		3,313	3,593
Apr.		3,376	2,699
May		3,668	2,775
June		4,153	3,019
July		4,080	3,358
Aug.		6,429	3,767
Sept.		5,191	2,614
Oct.		4,985	2,539
Nov.		5,961	3,525
Dec.		6,720	2,560
Total		53,400	36,386

Hydraulic Institute

Charts—Copyright 1951, STEEL

mated at 58.9 million, was the highest recorded for this time of year, the U. S. Bureau of the Census reports. Nonagricultural employment continued at the January level of 53 million but it exceeded February of last year by a whopping 2.25 million. This sizable increase occurred despite the induction of substantial numbers of young men into the armed forces. Men past draft age and women each accounted for about half of the gains recorded.

As might be expected, unemployment failed to show its customary seasonal rise between January and February. In fact it slipped off slightly to 2.4 million. The civilian labor force, which includes both the employed and the unemployed, was estimated at 61.3 million in February, or at about the level of January.

Inventories Swell . . .

Inventories of the nation's manufacturers, wholesalers and retailers rose $2.1 billion from Jan. 1 to Feb. 1. This rise, says the U. S. Office of Business Economics, put the value at $63.1 billion on Feb. 1. This figure consisted of $35.2 billion for manufacturers, $11.3 billion for wholesalers, and $16.6 billion for retailers.

On Jan. 1 the values were: Manufacturers, $34.2 billion; wholesalers, $10.8 billion; and retailers, $16.1 billion.

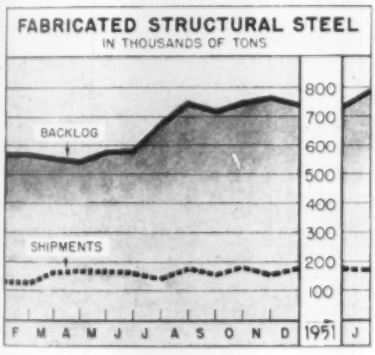
On Feb. 1, 1950, the inventories of the three groups totaled $51.8 billion.

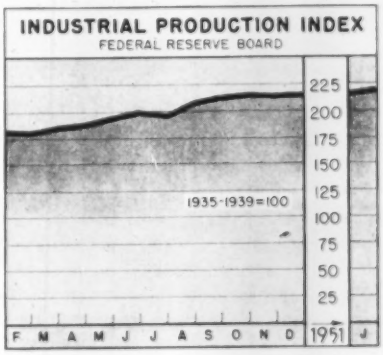
Trends Fore and Aft . . .

Signode Steel Strapping Co., Chicago, expects more than a normal increase in the use of strapping to result from an increase in shipment of military supplies and the stimulation that the military and foreign aid program will give to the economy . . . Sale of 37,042,303 radio receiving tubes in January was a drop from the 38,723,601 sold in December but a big increase over the 22,272,024 sold in January, 1950 . . . New orders to the screw machine products industry in January rose to 528 per cent of the 1940 average of 100. The new level is considerably higher than that of any month in 1950.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction	Mar.12	Ironers	Feb.19	Refrigerators	Mar.12
Durable Goods	Feb.12	Malleable Cast.	Mar.12	Steel Castings	Feb.26
Employ., Steel	Mar.5	Metalwkg. Employ.	Feb.19	Steel Forgings	Feb.26
Foundry Equip.	Mar.5	Price Indexes	Feb.19	Steel Shipments	Mar.5
Freight Cars	Feb.26	Purchasing Power	Feb.5	Vacuum Cleaners	Feb.19
Furnaces, Indus.	Feb.26	Radio, TV	Feb.26	Wages, Metalwkg.	Mar.12
Furnaces, W. Air	Jan.22	Ranges, Elec.	Mar.12	Washers	Feb.19
Gray Iron Castings	Mar.5	Ranges, Gas	Mar.5	Water Heaters	Dec.25





Fabricated Structural Steel

Thousands of Net Tons

	Shipments 1951	Shipments 1950	Backlog 1951	Backlog 1950
Jan.	171.9	135.2	788	565
Feb.	....	129.6	...	565
Mar.	....	156.8	...	556
Apr.	....	164.4	...	540
May	....	168.1	...	578
June	....	172.1	...	580
July	....	141.6	...	684
Aug.	....	180.7	...	741
Sept.	....	157.0	...	716
Oct.	....	183.3	...	747
Nov.	....	167.1	...	763
Dec.	....	175.6	...	736
Total	....	1,931.5	...	...

American Institute of Steel Construction

Industrial Production Index

	Total Production 1951	Total Production 1950	Iron, Steel 1951	Iron, Steel 1950	Non-ferrous 1951	Non-ferrous 1950
Jan.	219	183	253	203	225	180
Feb.	....	180	....	201	....	190
Mar.	....	187	....	205	....	200
Apr.	....	190	....	222	....	198
May	....	195	....	226	....	197
June	....	199	....	231	....	207
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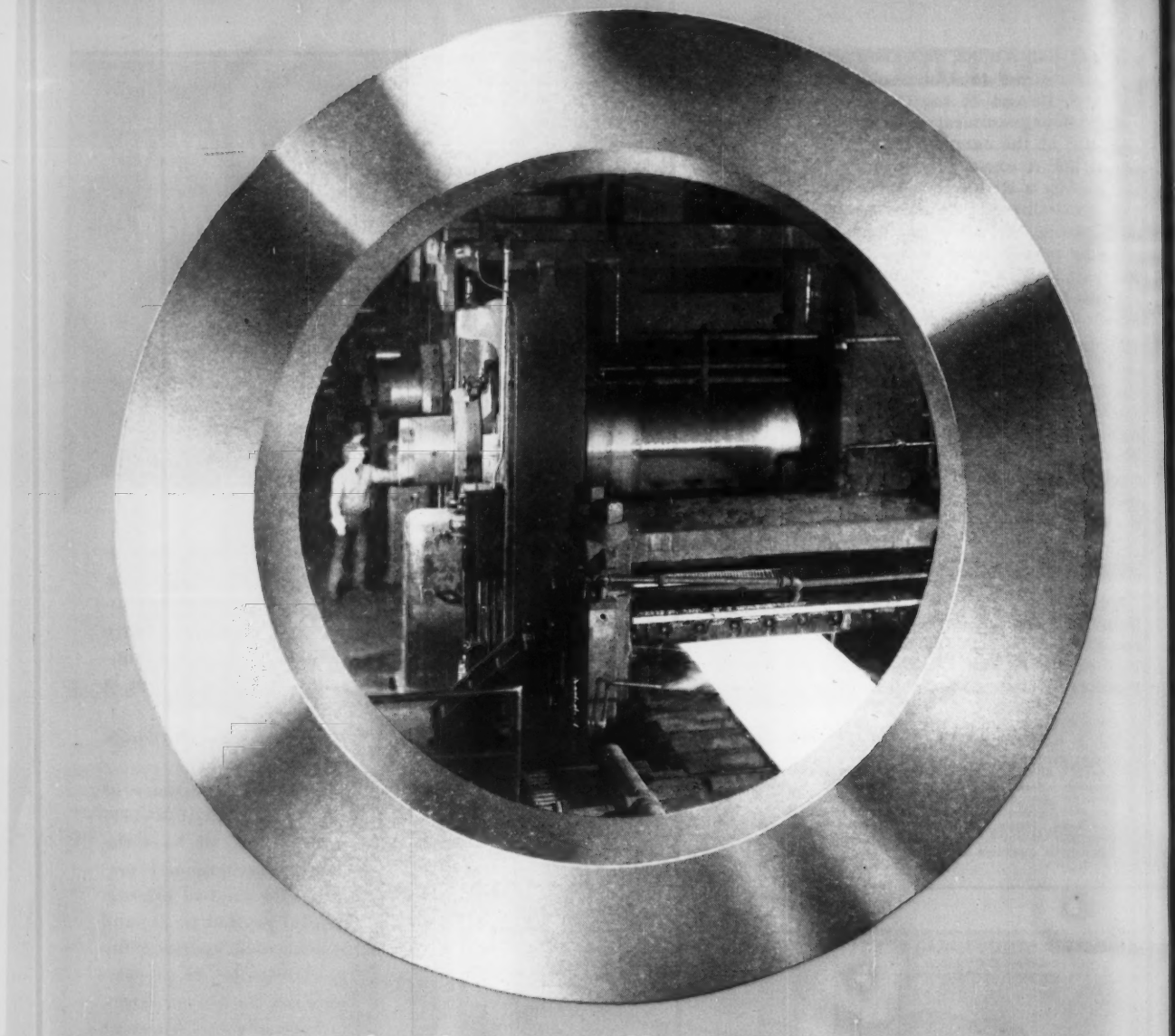
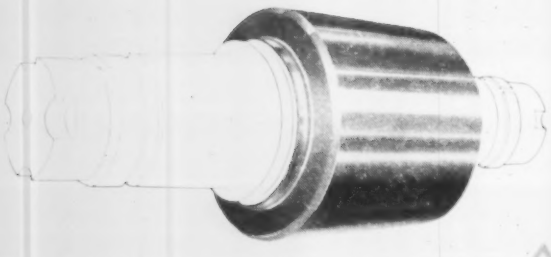


Custom-built to roll more tons . . .

Heppenstall Sleeves



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Made from Heppenstall's own steels, each sleeve is mandrel forged—worked thoroughly to produce maximum density and grain refinement. With careful heat treating, the working surface of every sleeve is tempered to meet exact hardness specifications. Heppenstall also makes forged arbors . . . has facilities to grind arbors and sleeves for perfect shrink fitting. Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

Heppenstall

—the most dependable name in forgings

Men of Industry

ARTHUR P. CORTELYOU
. . . gen. mgr. at U. S. Vanadium Co.

A. MACFADYEN
. . . Page-Hersey Tubes pres., gen. mgr.

L. F. McCAFFREY
. . . joins Empire Steel Corp.

Arthur P. Cortelyou was appointed general manager of **United States Vanadium Co.**, a division of Union Carbide & Carbon Corp., with headquarters in New York. **R. M. Mahoney**, formerly of the company's Pine Creek operations near Bishop, Calif., was transferred to New York, where he will continue in charge of the industrial relations activities.

John F. Tyler was appointed assistant sales manager, building products division, **American Welding & Mfg. Co.**, Warren, O.

Trailmobile Co., Cincinnati, elected as directors **W. A. Burns Jr.**, vice president and sales manager; and **J. B. Wharton Jr.**, vice president and treasurer.

Link-Belt Co., Chicago, appointed **Richard Moyer** general manager of its north central division, with headquarters at Minneapolis, to succeed **Leslie J. Carson** who has accepted the position of price executive of the machinery branch, Industrial Materials & Manufactured Goods Division, O.P.S., Washington. **Fred B. Skeates** succeeds Mr. Moyer as general superintendent at the Pershing road plant in Chicago. **Walter Balton** is now foundry superintendent.

Miller Electric Mfg. Co., Appleton, Wis., announces the following changes in its sales organization: **R. A. Metcalf** was appointed assistant sales manager; **W. H. Siefferman** takes over the Wisconsin, Minnesota, North and South Dakota territory; **F. H. Beck**, the Michigan territory; **J. E. Vosburgh** is western district manager.

Page-Hersey Tubes Ltd., Toronto, Canada, elected **A. Macfadyen** as president and general manager following retirement of **A. W. Holmested** as president. **W. E. Bannerman** was elected vice president, and **C. S. Webber** as assistant to the president.

Brookes D. Billman, for a number of years assistant to the manager of the Butler, Pa., works, **Armco Steel Corp.**, Middletown, O., was appointed assistant director of personal relations for the corporation.

C. Edgar Smith, executive vice president, was named president of **Towmotor Corp.**, Cleveland. **Lester M. Sears** was elevated to board chairman. **James H. Coolidge**, vice president and treasurer of Thompson Products Inc., was added to the Towmotor board.

North American Aviation Inc., Inglewood, Calif., has named two vice presidents. **L. L. Waite**, formerly in charge of the aerophysics laboratory, will head the company's new electromechanical division. **C. J. Gallant**, will be vice president and general manager of the company's Columbus division.

Wyman L. Wills was placed in charge of extruded solder sales at the Whiting, Ind., plant of **Federated Metals Division**, American Smelting & Refining Co. Mr. Wills replaces the late **James C. Shaw.**

New appointments at **Lindberg Steel Treating Co.**, Chicago, include: **Howard E. Pellett**, sales engineer, Los Angeles plant; **Robert T. Sinnott**, appointed to the metallurgical department; and **Robert J. Funkey**, appointed to the electrical department.

L. F. McCaffrey has joined **Empire Steel Corp.**, Mansfield, O., as assistant general superintendent. He also will be in charge of the new hot strip mill installation now under construction. He formerly was with Republic Steel Corp., Steel Co. of Canada, Algoma Steel Corp., and recently left the National Steel Co. of Brazil to join Empire.

Midvale Co., Philadelphia, elected **Lloyd R. Loewen** as treasurer and assistant secretary.

Food Machinery & Chemical Corp. appointed **Brig. Gen. Joseph A. Holly**, U. S. Army (ret.), as executive assistant to the management of its newly established Ordnance Division at San Jose, Mich.

P. G. Mattern was elected assistant secretary of **Bethlehem Pacific Coast Steel Corp.**, San Francisco, and continues as manager of claims.

Wallace B. MacGregor was named materials control supervisor for **Hunt-Spiller Mfg. Corp.**, Boston.

James F. Bishop, secretary-treasurer, **American Hoist & Derrick Co.**, St. Paul, was elected a director.

Wiser Brown was named chief industrial engineer of **Aluminum Co. of America's** operating department. He moves from Cleveland, where he was in charge of magnesium fabricating activities for the company, to Alcoa's Pittsburgh headquarters.

Harry Brownlee was placed in charge of a new Gulf Coast office opened in the International Trade Mart build-

ing in New Orleans by **Paulsen-Webber Cordage Corp.**

A. F. Garcia was appointed plant manager of the Tacoma, Wash., reduction works of **Kaiser Aluminum & Chemical Corp.** to succeed **C. P. Love,** appointed to manage the corporation's new New Orleans reduction operations.

Frederic L. Rowe was appointed district sales manager of the **American Chain & Manley** divisions of American Chain & Cable Co. Inc. for the Pacific Coast area, with headquarters at San Francisco.

M. B. Garber, director of sales, **Thew Shovel Co.,** Lorain, O., will be available as an on-call adviser to NPA on matters pertaining to the requirement, use and production of construction machinery.

J. E. Nordheim was appointed superintendent of the sheet mill at the Park Works of **Crucible Steel Co. of America,** Pittsburgh.

Exolon Co., Tonawanda, N. Y., elected **Dell M. Ramsey** as vice president and works manager, and **Samuel F. Walton** as vice president and technical director.

John L. Roth was named commercial sales manager of **York Corp.'s** central district. He will be in Chicago, 185 N. Wabash Ave., offices of Westerlin & Campbell Co., York subsidiary.

Charles S. Wiggins was appointed assistant to **Karl J. Ammerman,** manager of the Washington office of **Borg-Warner Corp.,** Chicago.

Jacob Levinson was named director of purchases for **Levinson Steel Co.,** Pittsburgh, and **Louis Siegel** was made purchasing agent.

JACOB LEVINSON
. . . Levinson Steel director of purchases

NORMAN W. CALKINS
. . . mgr. of tool steel sales for Carpenter Steel

Norman W. Calkins was named manager of tool steel sales, and **Harold A. Brossman,** manager of alloy steel sales by **Carpenter Steel Co.,** Reading, Pa.

R. W. Schwartz, sales and service engineer, was transferred from the home office of **Production Machine Co.** at Greenfield, Mass., and will be located in central Ohio to cover all of Ohio, western New York and Pennsylvania, and northern sections of Kentucky and West Virginia.

Robert E. Gilmore was appointed assistant factory manager, diesel engine factory, **Caterpillar Tractor Co.,** Peoria, Ill.

M. A. Moore was appointed eastern division manufacturing and sales manager, **Double Seal Ring Co.,** with office at New Rochelle, N. Y.

Hanson-Van Winkle-Munning Co. of Matawan, N. J., appointed **Calvin E. A. Solla** to its sales force.

George J. Campbell Jr., president,

LOUIS SIEGEL
. . . purchasing agent at Levinson Steel

HAROLD A. BROSSMAN
. . . manages alloy steel sales for Carpenter

Campbell Chain Co., was elected president of the **Manufacturers' Association of York, Pa.**

Paul A. Wick was named assistant to the president, **Rockwell Mfg. Co.,** Pittsburgh.

International Business Machines Corp., New York, appointed **J. L. Turney** assistant general service manager, and **Leo J. Langan** as manager, of all IBM sales and services in the New York downtown office.

Alloy Rods Co., York, Pa., created new executive offices and elected **C. R. Carlin** vice president in charge of production, and **R. K. Lee,** vice president in charge of research and engineering. Mr. Carlin was sales manager and Mr. Lee, manager of the research department.

Howard C. Ludlow was appointed metropolitan sales manager, metropolitan division, **VISIrecord Inc.,** Long Island City, N. Y. New offices for this division were opened at 535 Fifth Ave.

Dr. R. A. Lincoln was appointed manager, sales development and engineering service department, **Allegheny Ludlum Steel Corp.,** Pittsburgh. He succeeds **William B. Pierce,** made technical director of the company. **C. R. Mitchell** was appointed to the newly created post of manager of stainless strip sales; **R. S. Robinson,** manager of carbon steel sales; and **Frank F. Young,** assistant manager, Pittsburgh district sales office. **C. G. Hathaway** was appointed head of the order entry division of the Brackenridge plant, succeeding **N. A. Crain,** retired. **J. P. Parsons** was named assistant manager of that division. **E. B. Van De Mark** was appointed manager of the order entry division.

ERMAND L. WATELET
. . . tool design dir., Brown & Sharpe

WILLIAM R. HAVLAK
. . . manages Dravo's contract dept., eng.

C. S. IMMIG
. . . directs purchases, Hydraulic Press Mfg.

Watervliet, N. Y., plant, to succeed **L. D. Burr,** retired. **E. Hauprich** was named assistant manager.

Ermand L. Watelet was appointed director of design of precision tools and gages by **Brown & Sharpe Mfg. Co.**, Providence, R. I. He joined the company in 1934 and since 1947 has been chief designer of small tools and gages.

E. A. Daniels and **E. O. Williams** were elected directors of **Victor Equipment Co.**, San Francisco. Both are vice presidents of the company.

Earle S. Thompson, president, West Penn Electric Co., was elected a director of **Yale & Towne Mfg. Co.**, New York, to succeed **Calvert Carey,** resigned.

Otis A. Kendall was appointed assistant sales manager for tabulating machines, management controls division, **Remington Rand Inc.,** New York.

H. H. McFarlane was appointed sales manager, **Cullen-Friestedt Co.,** Chicago.

William R. Havlak was named administrative manager of the contract department, engineering works division, of **Dravo Corp.**, Pittsburgh. Formerly assistant purchasing agent of the company, he is succeeded in that position by **Gustav Schwab Jr. Daniel F. Magner** has joined the staff of the machinery division as a sales engineer in the heating department.

Charles M. Hollis, controller of **Kaiser-Frazer Corp.,** Willow Run, Mich., was elected a vice president. **R. J. Jespersen** was appointed as assistant controller.

Howard K. Suter, formerly associated with the aviation engineering and sales division of Western Gear Works, was named plant manager of **Rosan Inc.,** South Gate, Calif.

Frank J. Mack was elected treasurer, **Fawick Airflex Co.,** Cleveland. After ten years at Cleveland Diesel Division of General Motors Corp., he entered the Fawick organization in 1948.

Hydraulic Press Mfg. Co., Mt. Gilead, O., appointed **C. S. Immig** director of purchases. Mr. Immig formerly was with Fairbanks, Morse & Co.

F. T. Swain was named personnel director of **Harnischfeger Corp.,** Milwaukee. He was formerly with the Waukegan Works of American Steel & Wire Co., where he was superintendent of industrial relations.

J. A. Hughes was elected a vice president of **Affiliated Gas Equipment Inc.** and appointed general manager of its **Bryant Heater Division,** Cleveland. **Robert M. Buck** succeeds **D. A. Campbell** as manager of Bryant Heater's industrial division.

Appointment of two sales executives as direct factory representatives to governmental agencies was announced by **Cummins Engine Co. Inc.,** Columbus, Ind. **C. B. Foster** will head a new department of the sales division as manager-contract sales. **John W. Post** was named regional manager of the newly created Washington region.

OBITUARIES...

Quincy M. Crater, 48, sales executive, **Westinghouse Electric Corp.,** Pittsburgh, died of a heart attack Mar. 8 at the company's East Pittsburgh plant. He was marine, aviation and transportation sales manager for the corporation's central division, which comprises territory between Philadelphia and Chicago.

E. Louis Fahrbach, 59, chief chemist for **Republic Steel Corp.** in Chicago, died Mar. 4.

R. G. Moeller, 55, head of the Detroit construction and industrial equipment firm of **R. G. Moeller Co.,** which he founded in 1924, died Feb. 28.

James W. Moore, 61, in charge of the special products division of **American Cast Iron Pipe Co.,** Birmingham, and an employee of that company for 34 years, died Mar. 5.

Ernest Murphy, 67, former president, **Pressed Steel Car Co. Inc.,** died of a heart attack at his home in Wilton, Conn., Mar. 4. He retired in March, 1948.

Stuart A. Dussault, 41, president and general manager, **Dussault Foundry Corp.,** Lockport, N. Y., died Mar. 5 in Madrid, Spain, during a European tour.

Joseph F. Buhrle, 70, co-founder of the **Lakeside Bronze Inc.** foundry, Buffalo, died Mar. 4. He had been vice president and treasurer of the firm for 19 years prior to his illness.

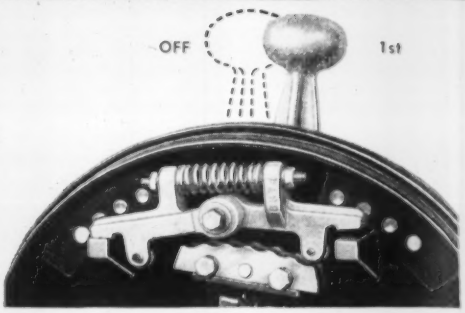
Paul H. Carlson, 48, chemical engineer and formerly sales manager, **American Instrument Co.,** Silver Spring, Md., died Mar. 4 after a long illness.

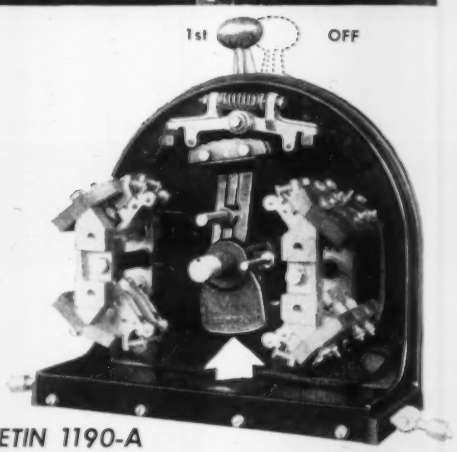
The off position of EC&M *improved* Cam Master Switches has a distinct feel. Like the automobile gear shift lever, there's a contrasting change between speed-points and when the lever goes into neutral. Rollers drop off the rails and there's a click as the roller-arm hits the stop from either direction.

Another important design feature maintains ability to inch easily. End-play clearance (up to $\frac{1}{8}$") between the two rollers and rail-ends gives a "lift" when moving out of the off position to the first point, either forward or reverse.

Individual speed points are also readily distinguishable with this 2-roller and 2-rail design. One long, low-stressed spring exerts roller pressure. A counterweight below the main shaft offsets the weight of the aluminum operating arm — aids in keeping it on the speed-point selected — prevents self-advance of the arm if the master is accidently jarred or the crane bumped.

The enclosing cover overlaps the frame, keeping exterior dust out. On the inside, hardened rollers ride on hardened rails — large diameter cams speed opening and closing of coin-silver contacts. Try these improved EC&M Master Switches — they're unequalled for speed-control applications.





SPECIFY EC&M BULLETIN 1190-A

Cam Masters for Cranes—Mill Auxiliaries

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering NEWS AT A GLANCE

DRILL LIFE SEXTUPLED—Trephining drills for cutting round test bars from armor plate have been made of 18-4-1 high-speed steel, requiring a complex series of heating, quenching and draw treatments. A tungsten-saving change to 6-6-4-2 molybdenum-type high-speed meant a new heat treatment cycle—preheat at 900° F, heat in salt at 1575°, immerse the cutting edge in high-temperature salt at 2250° for 5 minutes, quench in salt at 1000°, air cool and double draw at 1030°. The drills are hollow and remove chips through shank flutes which cannot be too hard or they will break. Each drill costs $30, putting a premium on their performance. Salt bath hardening extended average life from 50 test bars to 300. Navy practice calls for trephining about 2400 bars a month.

PATTERNS AT FORTY BELOW—Freezing mercury might sound like a laboratory stunt, but actually it is entirely practical and is being done commercially to produce patterns for investing molds to be used in precision casting. While the price of mercury has skyrocketed to better than $3 a pound, its use is still economical since there is no loss of the metal in the pattern application (p. 66). Frozen mercury pieces weld together on contact, making it an ideal way to build up complicated patterns.

SWEET AIR OF TEXAS—Here's one for you corrosion experts. A large chemical company erected ammonium sulphate reactors at plants in Baltimore and Pasadena, Tex. They are about 15 feet in diameter and require covers which were specified in type 347 stainless steel. The reaction involved is between sulphuric acid and ammonia, and at the Baltimore installation the cover corroded through in a few months while at the identical Texas job the original cover is still in service after several years of operation. The problem was "solved", according to the company's research director, simply by replacing the corroded covers in Maryland—three in one year, as a matter of fact.

NEPA IS NO MORE— Nuclear-Energy-Propulsion-Aircraft project which Fairchild Engine has been directing at Oak Ridge, Tenn., for over four years, with Allison, Continental Motors, GE, Lycoming, Westinghouse, United Aircraft, Wright and others co-operating, terminates April 30. But the Atomic Energy Commission is talking new projects with Consolidated-Vultee and GE which may translate NEPA's theoretical deductions into an actual nuclear power plant for aircraft. Underscore heavily that word "may". And while on the subject of atomic energy, jot down two new elements in your periodic table: Technetium (tc) and promethium (Pm), artificially produced, of course, by uranium fission, but nonetheless identifiable spectroscopically.

HIDDEN ARC WELDING—"Three-o'clock welding" is the term applied to a newly devised setup (p. 76) for welding a horizontal seam in vertical plates, in which the work remains stationary and the two electrodes travel along opposite sides of the joint. Flux is carried along the weld line on a moving belt.

THROWING MORE STEEL—Newest infantry weapons are the recoilless rifles which made their first appearance with U.S. forces toward the end of the last war. They are more accurate and have greater range than the bazooka, as well as being easily portable in the 57-mm and 75-mm sizes. Now going into production in plants of one of the large rubber companies is a 105-mm design (p.73) which is mounted on a jeep. Four types of projectiles for the recoilless refles have been developed, all having perforated cases, this being the means for minimizing the recoil of conventional rifles of such size. The Germans were the first to introduce them.

KERNELS, SOME CORN— Buick has switched from aluminum to cast iron pistons and currently is casting approximately 8000 a day, releasing more aluminum for other purposes . . . A metal pattern manufacturer says he bought around 30,000 pounds of electrolytic copper ingot the other day—for *37 cents a pound* against the current published market price of 24½c . . . Foundrymen studying application of the Croning or shell molding process are looking into the possibility of changing from dry to liquid resins to lick the dust problem arising in mixing fine sand and powdered resin . . . A manufacturer of luminescent packaging tape calls the stuff "the guiding light" . . . Atomic Energy Commission wants to encourage wider industrial participation in the manufacture of high-purity zirconium metal. It must be reduced from the tetrachloride, the same as titanium . . . A Dartmouth instructor is waving under the eyes of prospective manufacturers a gasoline-oxygen cutting torch which he says will save 25-30 per cent over acetylene in cutting, brazing, scarfing and related torch operations.

—A.H.A.

Metalworking Outlook—p. 29 *Market Outlook—p. 129*

FROZEN MERCURY PATTERNS

Add Flexibility to Precision Casting

Intricate shapes cast to close tolerances in wide variety of metals and alloys. Weights range up to 90 pounds

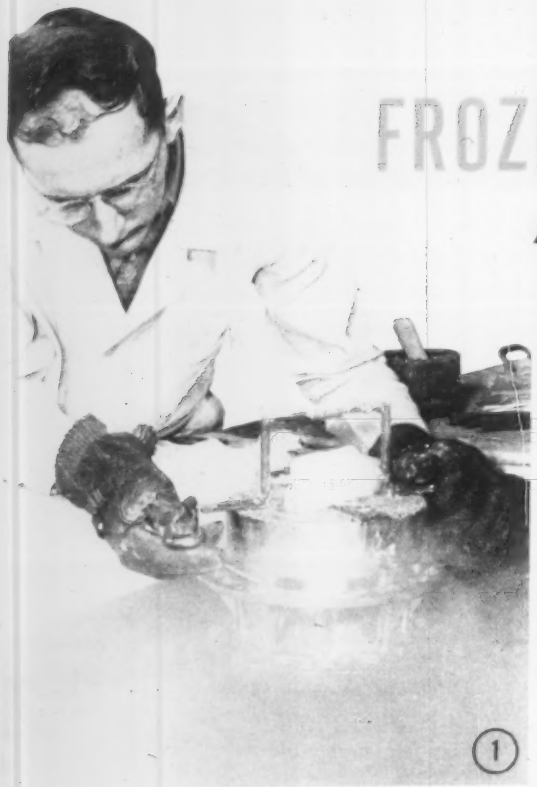


Fig. 1—Half of this die has been removed to expose the upper part of a large mercury pattern with handling bar frozen in place. Fumes are from the dry ice in the acetone bath. Pieces of dry ice are placed on top of the pattern

PRECISION casting a variety of ferrous and nonferrous metals and alloys in ceramic molds to tolerances of plus or minus 0.002-inch and in a size range from about 90 pounds down to a few ounces is being carried out successfully with the novel use of frozen mercury as a pattern material instead of the conventional wax used in investment casting setups. Advantages of the mercury include the ability to join or "weld" component frozen pieces by light pressure; the well-known characteristic of the metal to flow readily into minute openings; ease of freezing in an acetone bath (mercury becomes solid at −40 F); and the virtual 100 per cent recovery of the pattern metal.

Idea of using mercury in this connection was developed by E. F. Kohl who had extensive experience with the lost-wax investment casting process and later turned to metals such as bismuth, antimony and finally mercury. He eventually identified the technique as the Mercast process and sold control of rights to Atlas Corp. which in turn has licensed three companies to use it commercially—Sperry Gyroscope Co., Thompson Products Inc., and Alloy Precision Castings Co., Cleveland. The latter, known prior to July 1, 1950, as the National Bronze & Aluminum Foundry Co., received a license in 1947, about four years after Atlas purchased Mercast. This company's adaptation of the process is reviewed herein.

Essential to the success of the technique, as discovered early in Kohl's research, is a special type of silica-base ceramic shell mold, entirely free from moisture and with inherent high gas permeability and fairly good heat conductivity to insure sound castings free from gas or blowholes with fine grain size commensurate with the intricacies and variations in section thickness.

Patterns from Steel Dies — Tracing through the principal steps in the process, the first is to machine and finish a die into which the mercury is poured and frozen. Usually of tool steel, dies must be designed and machined carefully, with proper attention to parting and to gating and risering, so that the frozen pattern can be easily removed. Suitable allowance also must be made for shrinking of the mercury as it freezes and of the casting metal after it is poured into the ceramic mold. Dies usually are developed from an exact wood model of the part to be cast.

Frequent use is made of booking dies, as shown in an accompanying sequence of perspective drawings. They may permit casting pieces otherwise too costly or even impossible to cast, and in addition can pro-

Fig. 2—Assembling steel die to receive liquid mercury involves positioning of lifting ring to facilitate handling of the frozen pattern

By A. H. ALLEN
Associate Editor, STEEL
Process Photos by Dan Reebel, Associate Editor

vide advantages in terms of weight saving, time saving, less machining and structural qualities.

Die costs admittedly are on the high side, making it more attractive to adapt the process where large production runs are involved. However, in the experience of Alloy Precision Castings with over 200 different parts covering a wide range of shapes and sizes, as few as ten patterns from a single die have been run on a production basis. Dies, of course, can be stored easily and quickly pulled out for rerun. This may not be the case where dies are of low melting point alloy as in the lost wax method.

In assembling the elements of a die, they are maintained in a bath of warm (80°F) acetone in a large tank adjacent to the assembly bench, the liquid serving as a lubricant and also preventing any moisture from contact with the steel surface of the die. A handle or ring is inserted in the gate or riser, and occasionally an additional aluminum "lightener ring" to reduce the amount of mercury required to fill the die and riser. After assembly, the die is filled with acetone and transferred to the freezing tank, measuring about 4 feet wide by 12 feet long and 4 feet deep on the inside, which is steel lined and backed by 6 inches of insulation. It is filled to a depth of about 20 inches with acetone solution maintained at a temperature of −80 to −100°F by means of dry ice placed in three transverse compartments in the tank plus additional cakes in the solution itself. Suitable racks and platforms are positioned inside the tank so that operators can position the dies for filling with mercury and then submerge them in the bath to various depths, depending upon the size of the die.

Tons of Mercury—Storage vessel for mercury is hung directly over the tank and is connected to the system of pipes and other storage receptacles which make the liquid metal available at several points in the department. The system contains approximately 8 tons of mercury, at present market levels worth something over $47,000. Recovery is better than 99 per cent and precautions taken to avoid losses include such things as washing down the floor of the mold-making area every night and separating any mercury particles from the wash water before it is flushed to the sewer.

As the mercury pattern freezes, it shrinks slightly, so more liquid is poured into the riser to keep it filled until the entire mass is solid. Rate of freezing, of course, depends upon the sections involved; the average size pattern is solid in a matter of minutes or so.

When freezing is completed, the die and pattern are transferred to a second acetone tank by means of a chain hoist traveling on overhead monorail. Here the dies are placed on racks and are disassembled quickly to permit removal of any flash from the pattern. This is easily scraped away, the dislodged pieces dropping to the bottom of the tank. A chunk of dry ice usually is placed on top of the pattern during these touch-up operations, as shown in one of the illustrations. The solid mercury is easily removed from the die because of the lubricating action.

Fig. 3—Here the dies are being filled with mercury and lowered into a bath of acetone for freezing. Note cakes of dry ice in the bath and the mercury storage cylinder. Metal is poured from small cans

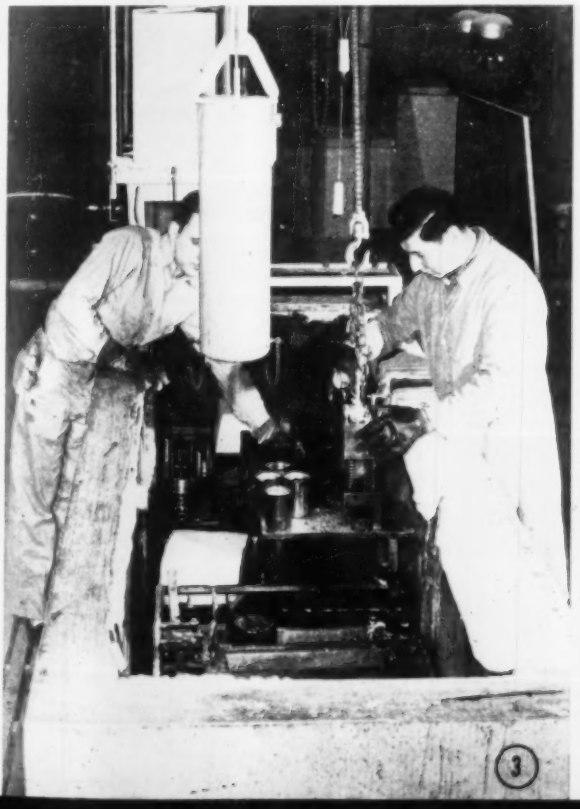
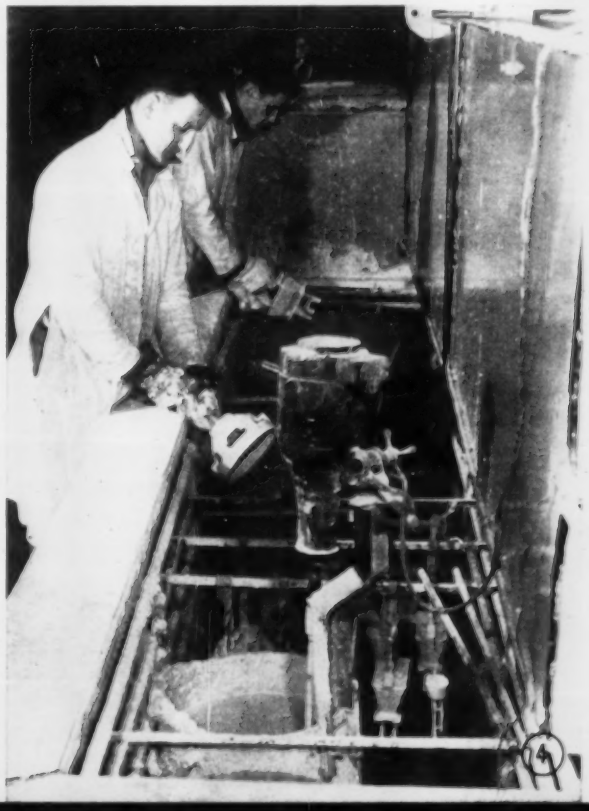


Fig. 4—Frozen mercury pattern receives its primary dips of ceramic as a shell is built up over the pattern. Ceramic mixture fills the receptacle in the foreground, with electric agitator mounted on its side



of the acetone. Sections as thin as 0.050-inch are readily produced in the frozen pattern.

Shell Built Up by Dipping—Next step is to transfer the pattern to a ceramic dip, comprising two long rectangular tanks, back to back, one for the so-called primary dip and the other for the finish dip. Ceramic material has a silica base with a special hydrocarbon vehicle which vaporizes at relatively low temperature. Fineness of the ceramic depends on the degree of detail and smoothness of finish desired in the casting, the primary dip material naturally being of smaller particle size than the finish dip. Both have a syrupy consistency and are constantly agitated while patterns are being coated. Anywhere from seven to fourteen dips usually are required to build up a ceramic layer approximately $\frac{1}{8}$-inch thick. Between dips the patterns are hung on cross-rods in the dip tank, so excess ceramic can drain off.

Brine pipes inside the dip tanks keep the temperature down to avoid any possibility of the pattern softening before the ceramic has set. The "green" investments are moved to a circular drain table, linoleum lined, where a slight spray of liquid mercury is sufficient to melt the top of the frozen riser and allow all the metal contained in the shell to drain off and pass through a coarse cloth filter which removes any adhering ceramic material.

The liquid metal then is forced through a pipe by air pressure to a cascade of cleaning solutions—sodium hydroxide, water, nitric acid, water and acetone, in that order—through which the mercury descends by gravity and then returns to the supply system for reuse.

Molds Fired and Preheated—Succeeding steps in the process are similar to other types of precision casting. Ceramic shells are fired in an electric furnace at approximately 1850° F for $1\frac{1}{2}$ hours, the pieces being placed in Inconel pans containing a layer of loose ground mica. After air cooling they are positioned in 12-inch cylindrical flasks, 12-14 inches deep, of conventional heat-resisting alloy sheet. A backing of lake sand is poured around the outside of the shell to fill the flask, leaving only the pouring gate exposed. A wad of cotton is placed therein to avoid contamination of the mold.

Before pouring, the flasks are preheated in electric furnaces which will accommodate about 25 large flasks at a time. Temperature varies widely, sometimes as low as 600° F and, in the case of exceptionally thin-walled castings—small gas turbine blade elements for example—up to 2100° F. Time at heat varies between 45 and 90 minutes.

Metal is melted in any one of three induction furnaces, with capacities of 50, 150 and 300 pounds respectively. It is tapped into two-man hand ladles and poured into molds which are lined up on benches immediately in front of the preheat furnaces. After the castings have been shaken out, the flasks are returned for reuse, and the backing sand screened to remove the broken ceramic pieces which are discarded.

No limits are placed on the variety of metals which can be cast by the process. Included in the 200-odd different castings already supplied by Alloy Precision Castings have been carbon steel, stainless steel, ranging from the 400 series or martensitic types to the 300 series austenitic group; higher heat resistant nonmachinable alloys such as the stellites and Hastelloys; copper, brass, bronze and aluminum. The special ceramic shell mold, with inherent high gas permeability and good heat conductivity, helps to insure soundness in both large and small sizes of castings, as well as freedom from gas or blowholes and reasonably fine grain size, commensurate with the complexity and variations in section thickness.

In many cases, parts in the as-cast condition are ready for use after trimming gates and risers and cleaning with a light sandblast. This permits taking advantage of the as-cast physical properties with only a low-temperature stress relief; nonhardenable alloys do not even require this. Precision castings of aluminum alloys such as Alcoa Nos. 43, 319 and 356, are poured centrifugally and show physicals comparable with permanent mold castings.

Aircraft Specs Met—A typical casting, for which the fired ceramic mold is shown in one of the illustrations, is a quick-detachable mounting bracket for a 300-ampere Westinghouse aircraft generator. The casting is about 8 inches in diameter, of 410 stainless steel, made to aircraft specifications calling for tolerances within plus or minus 0.002-inch. It is given three magnaflux tests and vibration tests by the

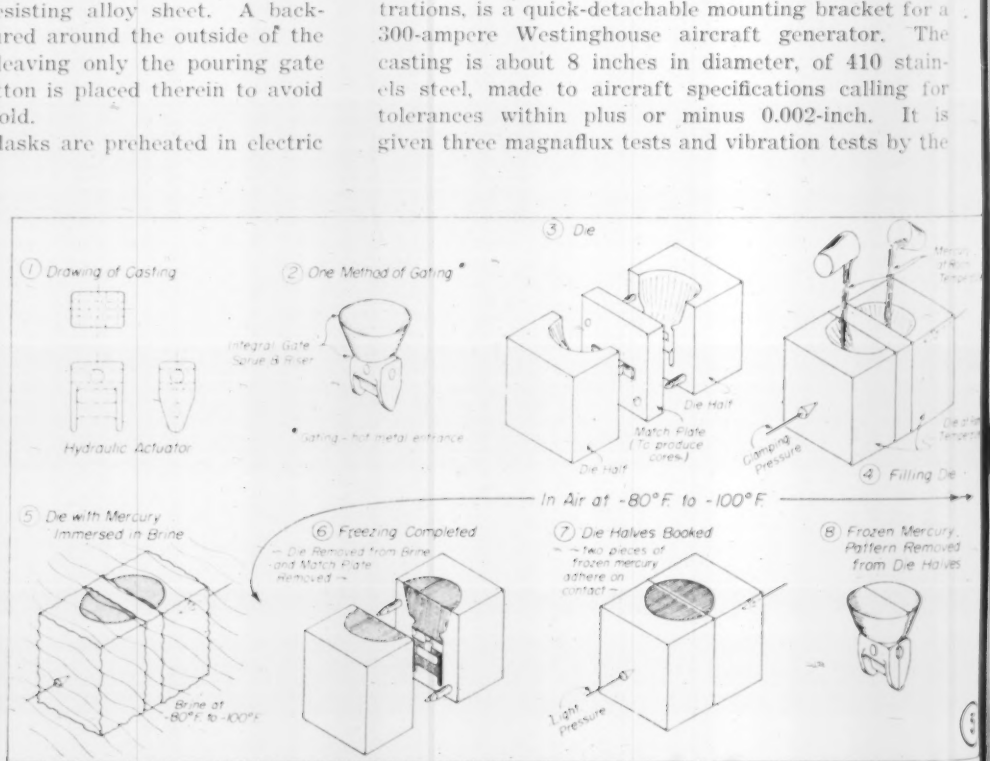

1 Drawing of Casting
2 One Method of Gating
Integral Gate Sprue & Riser
Hydraulic Actuator
3 Die
Die Half
Match Plate (To produce cores.)
Die Half
Clamping Pressure
4 Filling Die
In Air at -80°F to -100°F
5 Die with Mercury Immersed in Brine
Brine at -80°F to -100°F
6 Freezing Completed
Die Removed from Brine and Match Plate Removed
7 Die Halves Booked
two pieces of frozen mercury adhere on contact
1 atm. pressure
8 Frozen Mercury Pattern Removed from Die Halves

Fig. 5—Schematic sequence showing steps in preparation of a typical pattern by the die booking method

manufacturer prior to assembly. One face has a row of six "buttonholes" around the outer rim and these are cast sufficiently close so that no machining of them is required. It is produced by the booking-die technique previously described.

Fig. 6—Pouring a heat of SAE 1020 steel in ceramic shell molds which have been fired, backed with sand in flasks and preheated

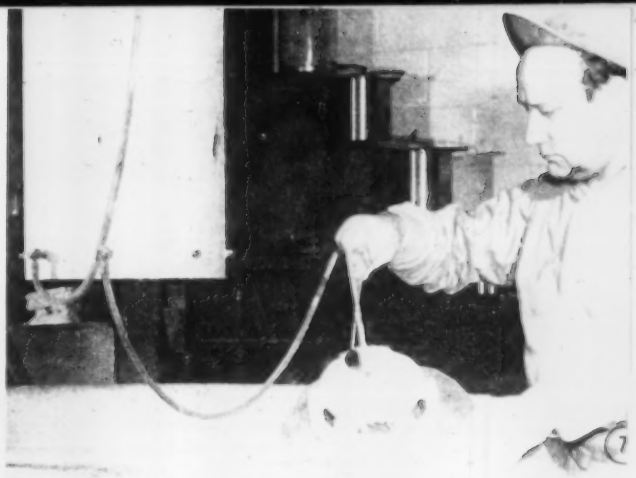


Fig. 7—First step in draining mercury from the ceramic shell is to spray room temperature mercury over the exposed gate to start the mercury flowing

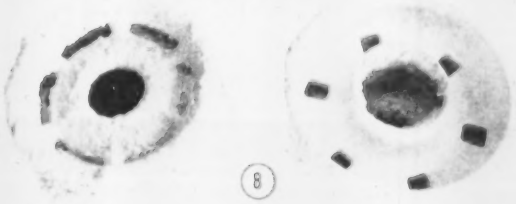
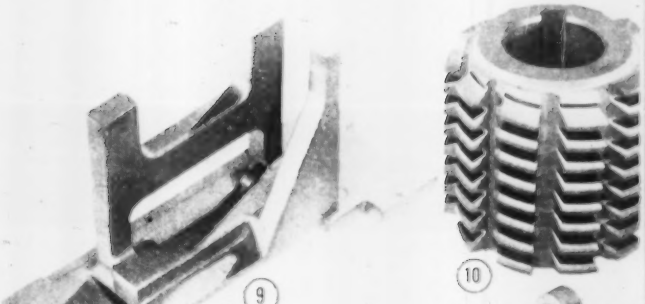
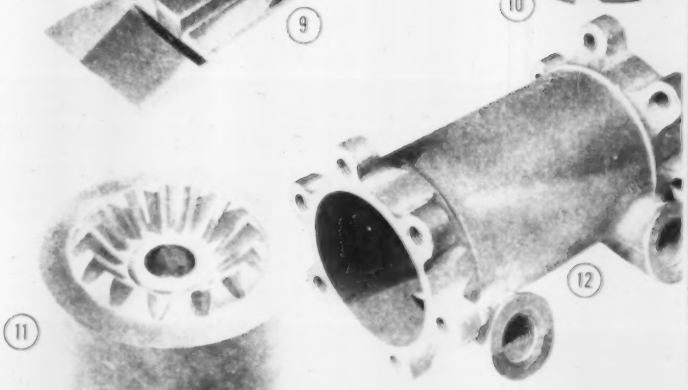
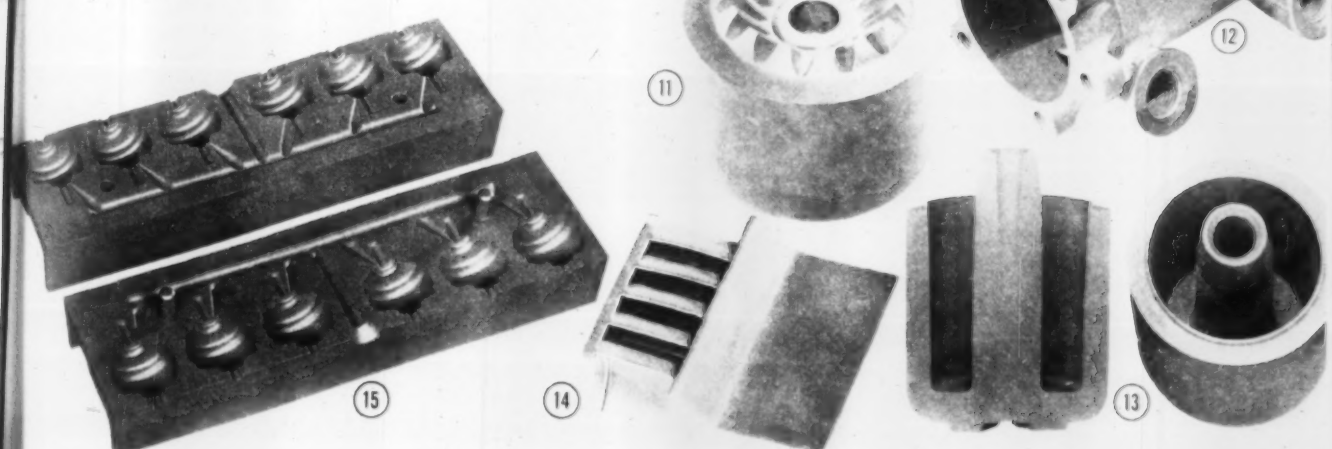


Fig. 8—Fired ceramic shell for an aircraft generator mounting bracket, cast in 410 stainless steel. Diameter is about 8 inches . . . Fig. 9—This intricately shaped business machine part, of SAE 1020 steel, lends itself ideally to precision casting because of the difficulty of machining it from bar stock . . . Fig. 10—Precision cast tool steel hob, requiring a light grind of only 0.0015-inch on the crown of the teeth before going to work . . . Fig. 11—Insert for a gear forging die, precision cast in tool steel by the frozen mercury process, which showed almost 50 per cent better wear than a forged and machined insert . . . Fig. 12—This cylinder for a hydraulic valve was cast in SAE 4140 steel, even including the threads in the two lower connections. Smaller holes were tapped . . . Fig. 13—Precision cast nozzle for a water-cooled oxygen line supplying a blast furnace . . . Fig. 14—Superhard alloys for gas turbine blade elements are precision cast with wall thickness as little as 0.050-inch . . . Fig. 15—An unusual casting to be handled by the investment process was this six-cavity die for production of plastic moldings







SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

Springfield, Vt.

TRY SOMETHING DIFFERENT: Recently I spent the better part of a day with Floyd J. McArthur, chief tool engineer of Jones & Lamson Machine Co. here, going over the working methods in the design and shop work under his supervision.

One thing which immediately impressed me was the size of this engineering department as compared to what it was only a few years ago. This does not mean a lot of overhead has been added; rather, with recognition of tool engineering as a distinct company activity, a lot of disconnected activities which previously existed now have been co-ordinated and gathered together in one department. Thus duplication of effort has been eliminated.

Another thing which impressed me was the questioning attitude maintained in this engineering department, and in its shop associations, toward anything which bears the traditional label. Just because something always has been done that way—or even if the textbooks and handbooks say that it should be done that way—that doesn't mean to Floyd McArthur and his associates that there is anything sacred about the method. Rather, such circumstances arouse them to challenge traditions by trying something entirely different. In that way they have come up with some valuable discoveries.

One, made back in 1947, was that when tungsten carbide tooling doesn't operate satisfactorily at supposedly high surface speed, the answer may lie in greatly increased speed — not in reduced speed. Through this reasoning, sensational practical results were attained in the machining of steel stem pinions in Fay automatics—the speed being stepped up from about 600 to 1100 surface feet per minute.

More recently, the conventional shape of teeth on high-speed steel milling cutters was questioned. Following Edison's axiom that "invention is one-tenth inspiration and nine-tenths perspiration," a series of step-by-step experiments in regrinding milling cutters to unconventional angles was inaugurated.

Thus it was found that hook-shaped teeth — similar to the curled chip saw teeth — are capable of remarkable speeds and feeds under certain conditions and on certain kinds of materials. These high-angle cutters already are in use in the threading die division and are finding profitable applications elsewhere in the shop.

Cases such as these cause me to wonder to just what extent the so-called art of cutting metals still is hampered by traditional, but nonetheless questionable, methods. Jones & Lamson tool engineers intend to keep right on with their questioning and to keep right on finding the answers by the "perspirational" method.

NEW CONDITIONS—NEW LOCATIONS: Over the weekend prior to the annual meeting of American Society of Tool Engineers in New York, Henry P. Chaplin, president, Cone Automatic Machine Co., Inc., Windsor, Vt., took me to Waterville, Me. There he showed me a striking example of tradition-smashing.

In this case the smashing was done by an educational institution—Colby College—in the establishment of which one of Mr. Chaplin's forebears played an important role, and in which his son, Peter Chaplin, now is enrolled as a student.

When Colby originally was established, it was in the midst of green fields beside the picturesque Kennebec river. As time went on, however, the green fields became a railroad yard, the river became lined with paper mills and the college buildings became old and outmoded. A major operation was in order, and a major operation was performed—with the generous help of alumni who rated tradition and sentiment secondary to recognition of economic changes and exercise of common sense.

And so it was that Colby College carved out for itself a completely new campus on a picturesque hill overlooking Waterville. There a completely new group of buildings in the finest architectural style and with the finest equipment that the midtwentieth century can provide, stands free and clear. The old campus and the old buildings are being completely abandoned. All tradition and all sentiment aside, both are a good riddance.

Many industries, not only in New England but throughout other old and middle-aged parts of our country, should follow the lead of Colby College. Some already have done so—and I have yet to hear of any who have regretted it. A machine shop over a millrace today is about as much of a museum piece as an automobile repair shop in a livery stable.

There is the old story of a bird called the phoenix. When the phoenix began to feel that old-age was hampering its activities, it flew into a fire—and emerged from the flames young and virile. That took willpower. Undoubtedly it was painful. The same is true of industrial reincarnation—but the end results certainly justify drastic measures.

MAKE THE MOST OF METAL: Throughout my swing around the New England circuit, I found machine tool builders extremely metal-conscious. I don't refer to their lively debate: To build or not to build a New England steel mill. I do refer to the question: Is all this weight of metal necessary in this mechanism?

Get maximum rigidity and vibration-damping with minimum expenditure of metal! That's the order of the day from management to engineering in the land of Yankee thrift and ingenuity.

Stainless Arc Welded Without Columbium

By RICHARD K. LEE
Vice President, Research
Alloy Rods Co.
York, Pa.

Corrosion resistance is obtained without critical columbium by welding extra low carbon steels with extra low carbon electrodes

WHEN weldments of stainless steel (chrome-nickel) cannot be annealed after welding or when the weldment is used in service in the temperature range of approximately 800° to 1500° F, columbium is usually added to prevent intergranular corrosion in the "heat affected zone." The recent government directive placing columbium on the critical list of strategic materials poses a substitution problem for plants welding stainless.

Titanium has characteristics similar to columbium and on most weldments could be substituted in the plate metal. But titanium is in short supply. And titanium cannot be substituted in the welding electrode because it is easily oxidized and very small quantities are recovered in the weld metal after transferring across the arc.

The success of arc welding is dependent upon sufficient heat to fuse completely both plate and weld metal into one integral part. The weld metal reaches a temperature above its melting point in the neighborhood of 2900° to 3000° F. The plate metal near the weld is very hot during the welding operation, because it is in contact with the molten metal. It reaches a temperature just below melting—around 2600° to 2700° F.

Compared to ordinary carbon steel, chrome-nickel stainless has very poor thermal conductivity or abil-

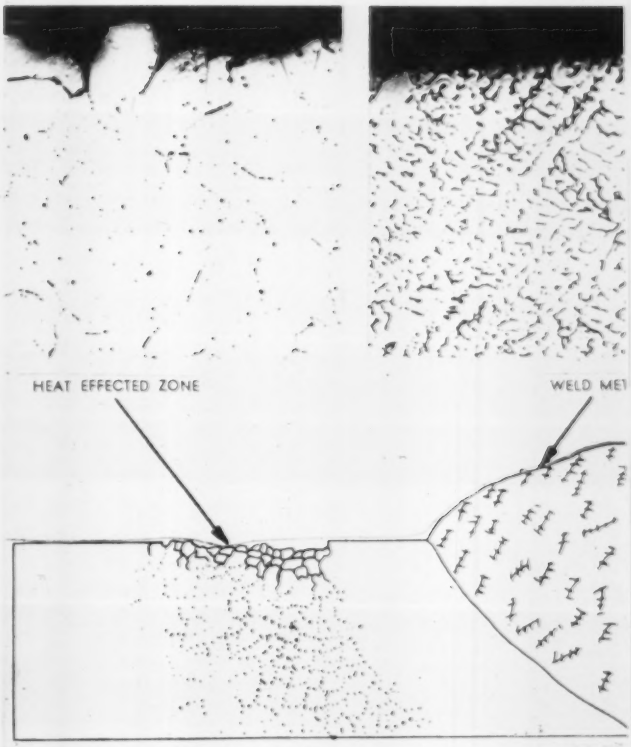


Fig. 1—Type 30 plate metal and 308 weld metal in as-welded condition. Note intergranular corrosive attack in heat affected zone. Etchant 10 per cent NaCN electrolytic. 250X

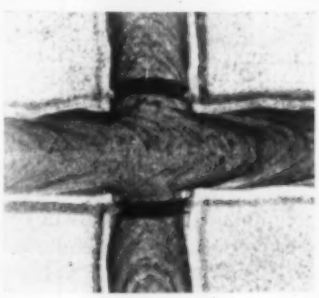


Fig. 5—Butt weld made with ½-inch type 347 plate and welded with type 308 extra low carbon electrodes. Compare with Fig. 3

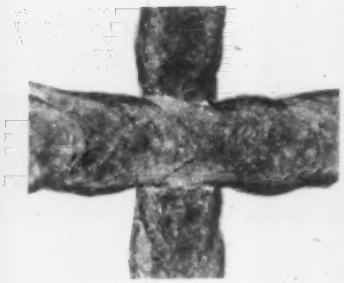
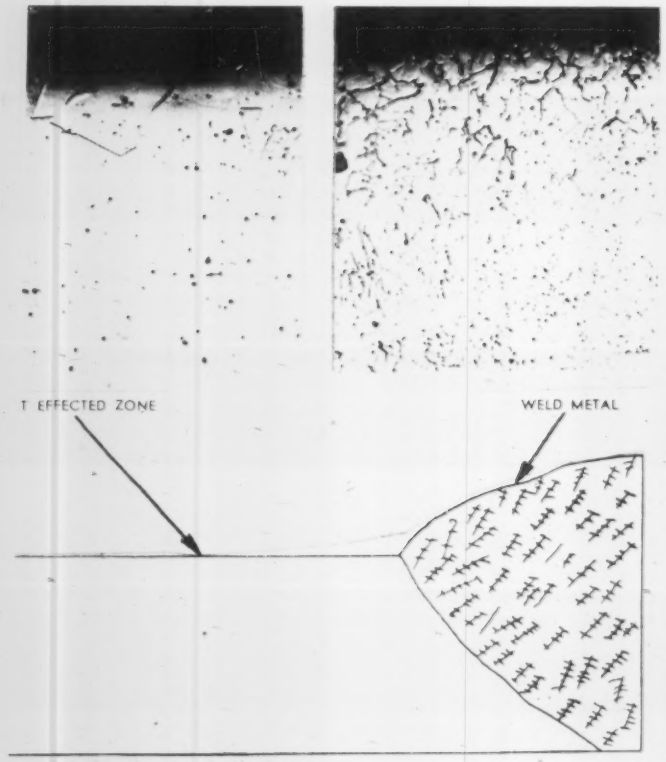


Fig. 6—Butt weld made with ½-inch type 321 (titanium stabilized) plate and welded with type 308 ELC electrodes. Compare with Fig. 3

ity to carry away and dissipate the heat of the weld metal. A sharp temperature difference exists which confines most of the heat to a narrow band or zone which is between 800° and 1500° F a short distance from the weld metal for a relatively long period of time. This zone is commonly known as the "heat affected zone." The welder has proof that this zone exists because immediately after completing a stainless steel weld he can place his finger within 1 inch of the weld. It would be impossible to do this on ordinary carbon steel without considerable discomfort.

Fig. 7—Type 304 ELC plate metal and type 308 ELC weld metal in as-welded condition. Note absence of intergranular corrosive attack in heat affected zone. Etchant 10 per cent NaCN electrolytic. 250X



Intergranular Corrosion—When austenitic stainless steels (chrome-nickel) are heated to the temperature range of 800° to 1500° F and held for any appreciable period of time such as occurs in the heat affected zone described above, chromium carbides precipitate at the grain boundaries. The formation of chromium carbide results in a depletion of chromium at the grain boundaries with resultant failure of the plate when used in critical corrosive service.

The addition of columbium or titanium will inhibit or prevent the formation of chromium carbide because both of these alloys have greater affinity for carbon than has chromium. Thus, the preferential formation of either columbium carbide or titanium carbide allows the chromium to go about its business of resisting corrosion.

Carbon Content Important—The obvious answer to the problem of carbide precipitation and resultantly poor corrosion resistance is to remove the carbon. It has long been known that up to 0.02 per cent carbon will remain in solution in austenite at temperatures of 800° to 1500° F. For example, in a stainless steel containing 0.07 per cent carbon, only 0.05 per cent will precipitate as chromium carbide with the balance of approximately 0.02 per cent remaining in solid solution. Carbon contents of 0.02 per cent maximum are not practical for steel mills to produce. Long time investigations have shown that only a slightly greater carbon content of 0.03 per cent maximum is, for all practical purposes, low enough to prevent appreciable carbide precipitation after short time exposure to temperatures of 800° to 1500° F.

Since 1945 the extra low carbon grades of stainless steel have been under development by several steel mills. Many weldments have been in successful operation since 1948 in a wide variety of industrial applications.

Extra low carbon (ELC) electrodes may be used successfully to weld type 347 plate (columbium stabilized) or type 321 plate (titanium stabilized). Type 316 ELC electrodes are also available for welding type 316 ELC plate and type 318 plate (316 columbium stabilized).

Design Problems Simplified

Material assistance towards simplifying the problems of designing all kinds of conveyor systems, mechanical power transmission and many different kinds of processing machinery is contained in the 1296 page catalog published by Link-Belt Co., Chicago. It contains 1673 tables and charts and took about three years to prepare. Available copies are being used to cover engineers, estimators and purchasing executives in whose hands this information will contribute to a more rapid solution of immediate problems.

A primary function of general catalog 900 is service as a reference tool. It presents basic engineering data facilitating the selection of chains and wheels, drives, power transmission elements, conveyors and process machines in the combinations which will best satisfy a wide range of functional requirements and operating conditions.

Latest in the group of new infantry weapons, the 105-mm jeep-mounted recoilless rifle. Tube is rifled for greater range and accuracy than the bazooka, and the ammunition round has a perforated steel case

Recoilless Rifle Now Built in 105-MM Size

Big brother to 57-mm and 75-mm type is jeep-mounted, with range of 8500 yards

RECOILLESS rifles, heralded in the latter days of World War II as the beginning of a new era in infantry weapons, are an important part of current ordnance planning and production. First to be developed were the 57-mm M18 and the 75-mm M20, under direction of Army Ordnance's research and development group which earlier had supervised introduction of the M1 Garand rifle and bazooka to combat service. Now a 105-mm M27 jeep-mounted recoilless rifle is in production and probably has seen service in Korea, since the military rarely talks about a new weapon until it has been exposed to an enemy.

Actually, both Germany and Allied military services had worked on recoilless weapons prior to their inception in the U. S. First combat action for the M18 was in April, 1945, only 21 months after the start of paper work on its development.

The new weapon was figured to be the answer to needs for an individual piece with greater power than the shoulder-fired rifle of smaller caliber and with greater range and accuracy than the bazooka or rocket-and-launcher combination which of course has no rifling to guide the projectile.

The basic recoilless rifle includes an enlarged forged alloy steel chamber, partially closed at the rear by a breechblock, containing venturi tubes and the firing pin, and opening at its front end into the rifled barrel, the latter a comparatively thin-wall seamless steel tubing.

Case Is Perforated—The ammunition round, comprising a loaded primed steel case, perforated to permit gas escape and with its projectile crimped into its mouth, is supported by the breech and the tube, and is head-spaced from a ring attached to the case near its forward end.

The shell is fitted with a pre-engraved rotating band, engaging with the rifling of the tube on loading. Inclination of the venturi openings to the rifle axis counteracts the torque transferred to the weapon as a reaction to the angular acceleration of the projectile. Pre-engraving of the projectile, used initially to approximate the conditions of the smooth-bore test rifle in the rifled test weapon, was retained for its advantages in reducing performance variations from round to round, reducing weight by elimination of engraving stresses in the tube, and reducing the probable departure from absolute recoillessness in the actual weapon.

Engraving places high stresses on the tube at the origin of the rifling and requires additional strength in the tube, obtainable only by increasing its thickness and consequently its weight.

Design Progressively Modified—Accelerated development of the 57-mm weapon was carried out by a manufacturing company which has set engineering and production records with .50-caliber machine guns during the war period. Its staff, working closely with the research and development group from ordnance, carried through several interim designs to standardization. The same procedure was followed on the two larger sizes, although the 105-mm was not ready before the end of hostilities.

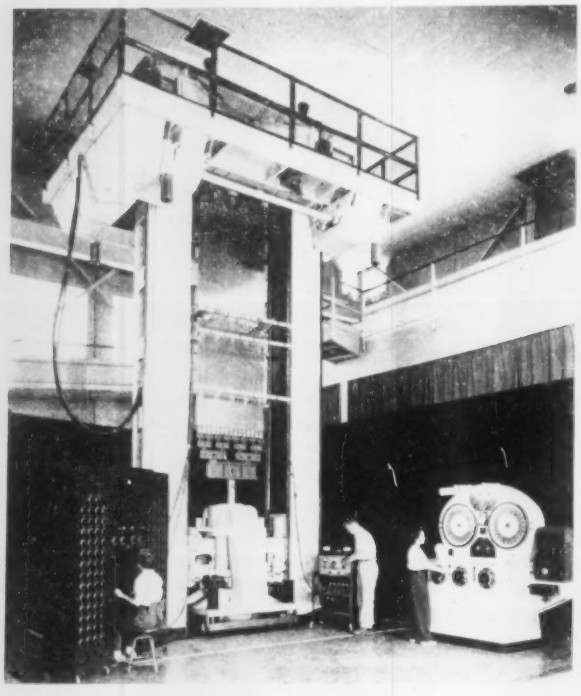
The latter unit is considered still in the develop-

mental stage. It weighs 365 pounds, including sighting mechanism and the M75 rifle mount, for attaching the weapon to a jeep, weighs another 336 pounds. Overall length is 135 inches, range is 8500 yards. Four different rounds of ammunition have been developed, enabling the rifle to cope with a variety of targets, including any known tank.

The weapon is a single-shot, hand loaded, direct or indirect fire type, rate of fire depending upon the crew but easily ten aimed shots a minute. It is considered in no sense an artillery piece, nor is it competitive with artillery, being an item of small arms development for small infantry units.

Strain Gaging on Universal Tester

HERE determining distribution of stresses in a flat aluminum alloy panel with circular notches cut in its edges at midsection, this universal testing machine is operated in the structures research lab of the National Advisory Committee for Aeronautics' Langley Aeronautical Laboratory near Hampton, Va. The hydraulically operated machine, 27 feet high and 8 feet wide (not including elevator), is capable of applying tensile or compressive loads up to 1.2 million pounds and was built for NACA by the Baldwin-Southwark



Division of Baldwin Lima-Hamilton Corp. Load on the machine is controlled conventionally by the handwheels which the technician in front of the cabinet at the right is operating, being indicated continuously on the dials. As many as 110 strain gages, both wire and electromagnetic types, may be attached to the specimen at strategic points, and the reaction under increasing or decreasing load noted from instruments mounted on the movable panels at the left. A project engineer observes the work at close range.

Controls Oil Burner Combustion

An electronic combustion safeguard system for commercial oil burners, which provides immediate cut-off of fuel in case of failure, has been announced by General Electric's Control Divisions. The co-ordinated equipment includes a switch-amplifier-contactor unit, phototube holder and electrode holder.

According to G-E engineers, the system assures positive protection against combustion failure because (1) if the gas pilot does not ignite, the oil valve cannot open, and (2) if the oil flame does not ignite, the supply of fuel is cut off. After the cut-off, the motor continues to operate for 30 seconds to purge the nozzle or cup of unburned fuel to prevent carbonizing and reduce field servicing. The system is then locked against further operation until manually reset.

The motor circuit is controlled directly by the built-in contactor for motor ratings up to and including ½-hp, 110/120 v, single phase. For larger motors and for multiphase operation, a complete line of magnetic switches is available for use in conjunction with the master control unit.

Skid-Proof Aircraft Brake

All B-47 and B-51 airplanes in use by the Air Force are now equipped with two devices that prevent skidding, no matter how much pressure is applied to the brake pedal. Officials at Wright-Patterson Air Force Base said plans were being made to equip other airplanes with the devices, which have been used by railroads for some time and might be applicable to trucks and busses.

The mechanisms, which "sense" a skid, automatically release pressure on the brake until the skidding condition stops. It is so sensitive that a heavy airplane can be brought to a smooth, nonskid stop no matter how tight the brakes are set.

The two devices, slightly different in detail, work on the same principle: The use of a valve to shut off pressure on the brake drum. One, the Decelostat, manufactured by Westinghouse Electric Corp., Pittsburgh, is based on the relative speed of the wheel to an energy wheel, while the other, the Hytrol, manufactured by Boeing Airplane Co., Seattle, employs a skid-detector and a solenoid valve.

Copper Standard Issued by ASTM

Standard on Copper and Copper Alloys has just been published by American Society for Testing Materials, Philadelphia. This edition contains 108 standards developed by Committee B-5 on copper and copper alloys and other committees.

A section with 20 specifications on copper, copper alloys and copper covered steel wire, rods, bars and stranded conductors for electrical purposes comes first. It is followed by a group of 13 specifications covering various nonferrous metals such as slab zinc, nickel, silicon copper, lead and others. Next come several sections with 63 specifications covering various copper and copper-alloy products. Also included are 10 test methods covering expansion, mercurous nitrate, resistivity, tension, micrographs, hardness, sampling and grain size evaluations.

In these times of scarcities
it is more than ever important to remember
that two or more heads are better than one.
Your suppliers, for example, know a great deal
about their materials, how to select, specify and fabricate them.
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It may be able to make scarce materials go further,
reduce costs, perhaps even speed up production.
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Foundry Cleaning Costs Cut $250 per Day

REPLACEMENT of outmoded equipment by a modern rotoblast rocker-barrel, a rotoblast table, and a unit-type dust collector is saving General Foundries of Milwaukee more than $250 a day. This jobbing foundry cleans miscellaneous gray iron and alloyed iron (semisteel) castings produced for the machinery, automotive, electrical and aircraft industries throughout the Midwest. More than $100 a day is saved in direct labor costs, and $150 a day in breakage.

The new equipment, manufactured and installed by Pangborn Corp., Hagerstown, Md., consists of a 6-foot single type LK rotoblast table with a maximum load of 5000 pounds, a 17½ cu ft rotoblast rocker-barrel which will clean up to 3000 pounds in one load, and a CK 6-foot unit-type dust collector.

Labor Savings $90 a Day—The gross savings, estimated at more than $250 a day, derive from two sources—labor and breakage. Intangible savings resulting from improvements in the quality of the finished product, improved working conditions, and abrasive savings are not included in the $250.

Four men were required to operate the equipment previously used. These operators worked on a piecework basis, 10 or 12 hours a day, and earned approximately $25 each. Thus, the direct labor cost amounted to about $100 to clean the smaller castings. One man working with the rotoblast barrel cleans the same quantity of castings in an 8-hour day. Piecework rates are not required to keep up with foundry production, and labor costs have been reduced to $10.40 per day—a saving of approximately $90 a day in cleaning small castings.

Nearly 90 per cent of the work formerly cleaned in the airblast room is now cleaned on the new rotoblast table unit. Because of the nature of airblast room cleaning it had been necessary to pay a premium wage for the work, bringing up the per-day labor cost to $19. Since the rototable cleaning is largely automatic, and faster, labor costs have been reduced to $7.80 per day, or a saving of $11.20.

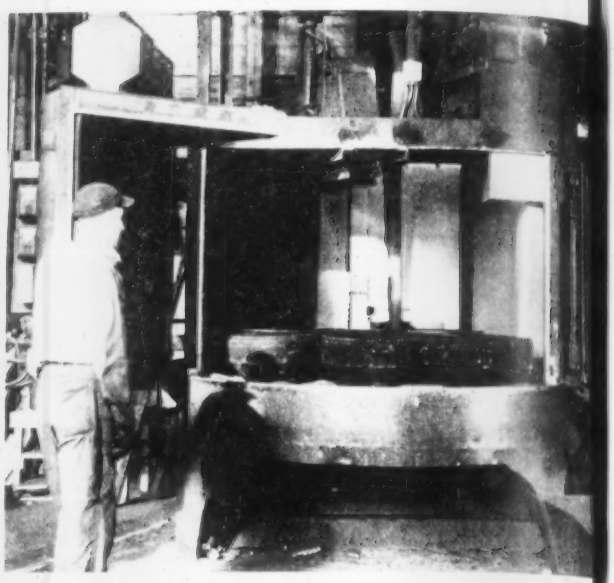
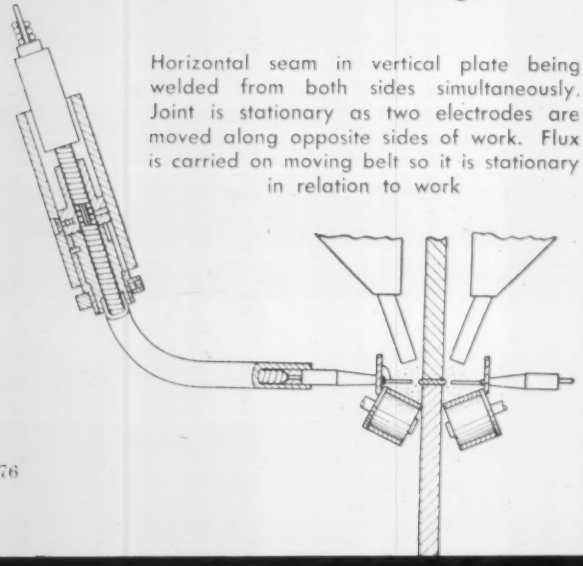


Table-room rotoblast unit cleans large castings at savings over former methods of $150 per day in breakage and $11.20 in labor

Breakage Eliminated—Breakage was an important cost factor because of the handling necessary in airblast room cleaning. One typical medium-sized casting costs approximately $40 to cast. Four or five of these castings were broken each day, or $160 to $200 of lost material and time. Breakage has been eliminated by the new cleaning and handling methods, resulting in a saving of over $150 a day.

Hidden Arc Welding Done in Any Position



Horizontal seam in vertical plate being welded from both sides simultaneously. Joint is stationary as two electrodes are moved along opposite sides of work. Flux is carried on moving belt so it is stationary in relation to work

HIDDEN ARC welding is no longer limited to jobs where the joint to be welded is in position for downhand welding. Lincoln Electric Co., Cleveland, has a new process that removes this limitation and enables the plate being welded to be positioned anywhere from flat to vertical, the joint being horizontal.

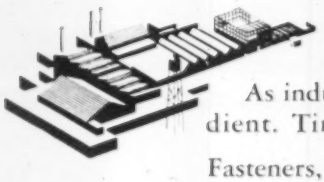
Process consists of new welding methods, procedures and equipment wherein the previous difficulty of directing the electrode and retaining flux and molten metal in a joint not lying flat are overcome. It is known as "3 o'clock welding" and greatly reduces the cost of welding and expands the possibilities for application of hidden arc techniques.

Double Duty—Horizontal positioning means welds

time is our greatest ally!

Let's save it on the assembly line

—beginning now!



As industry gears for defense, *time* is a most precious ingredient. Time to redesign, to retool and, finally, to produce.

Fasteners, as always, will play an important part in forging America's mailed fist. And the fasteners specified on blueprints today will determine whether production hours are saved, or wasted, in the future.

Careful selection of the most efficient fastener for each holding job can save these hours . . . can speed assembly and eliminate time-wasting fumbling. It is important, also, to consider design, tolerances as well as raw material, heat-treatment and finishes when making a fastener selection.

We at Lamson & Sessions will be happly to consult with you on any fastener problem—and recommend the most efficient one for the particular job at hand.

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from both sides of the joint can be made simultaneously. Actual arc time on a given joint is reduced by about 50 per cent and results in lower direct labor costs. Positioning each weld for downhand welding is eliminated by the process thus reducing handling and setup time.

In addition to reducing direct labor costs, savings are made because of the smaller sizes of electrode wire used. For example where on a downhand operation a 7/32-inch diameter electrode would be used, in a "3 o'clock" position a 3/32-inch or 1/8-inch diameter electrode is used.

Advantages to User — Small electrodes mean: Lower currents, less electrode, smaller quantities of flux and reduced cross sectional area of welds cutting down the amount of metal consumed in unnecessary buildup.

The welds can be made in either straight seams or following an irregular contour. Other advantages are a minimizing of the effects of distortion and causes of weld cracking. Tendency for burn-through is reduced and backup strips can be eliminated where two arcs on opposite sides of work are used.

Process is ideal for fabricating pipe, box sections, special I-beams and H-sections, joining clips to automobile bumpers, farm machinery parts and other machine frames.

Pump Testing Time Cut

Determination of horsepower input of centrifugal pumps has been simplified and made more accurate than the calibrated motor method by means of electric strain type torquemeters, plus highly accurate speed measuring equipment of a new type and other innovations. Time and labor of testing pumps are expected to be cut by at least 60 per cent in the laboratory of Allis-Chalmers Mfg. Co., Milwaukee, where the new equipment is installed.

Torque is measured by a Baldwin SR-4 torquemeter, which is based on SR-4 bonded resistance wire strain gages. These gages are bonded to a reduced section of a special alloy steel shaft at 45 degrees with longitudinal axis. In this position they respond to the maximum torsional strains resulting from applied torque. Gages are connected to form a Wheatstone bridge by which bending and thrust stresses are cancelled but torsional stresses are made cumulative. These stresses cause proportional bridge unbalance since the resistance of each gage changes in proportion to the strain on it. The four corners of the bridge are connected through slip rings to a measuring instrument. Torque, drive shaft speed, pump discharge and inlet pressure are all automatically recorded.

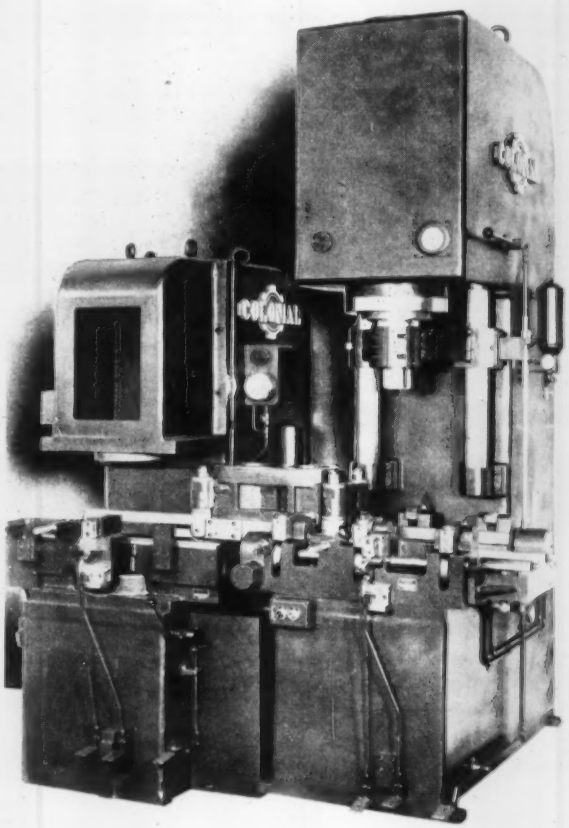
Transfer Principles Applied To Limited Lot Production

AN interesting application of transfer principles to conditions where—due to limited production quantities—completely automatic transfer of parts in process is not called for, is shown in the accompanying illustration. The two machines shown are a modified Colonial 35-ton 24-inch stroke hydraulic assembly press and a special 35-ton 15-inch stroke "inverted" Colonial assembly press. The latter in this case acts as a "disassembly press."

The two units are connected by a track. Track is oval in shape and endless, one rail being flat, the other V-shaped. In practice, these machines actually are not side by side but have a honing machine located between them.

This installation was developed for honing liners before assembling them in cylinder blocks. Liners are placed on pallets—two to a pallet. These pallets ride on rollers on the track connecting the machines. A pallet is moved manually into place in the assembly press against stops and locked in place by cams. Press next pushes the first sleeve into a bore of this pallet. Pallet then is indexed to a second position and a second sleeve is pushed into place.

Pallet is now transferred to the honing machine where liners are honed. From there it moves on to the "disassembly press" where a plunger operated by a hydraulic cylinder in the base of the machine pushes each liner in turn out of pallet bore into head of the press, from which the operator removes it and sends it on its way to stock.



Assembly press, lift and disassembly press, right, are connected by track for pallet-transfer of work. In production setup, honing machine is track-connected between these presses

New tighter fit

So positive is the fit between seat and plate on this time-tested Brosius-Westling Goggle Valve, that the unit pressure is comparable to that found on flange gaskets in pressure piping. In addition to this new feature, distortion is eliminated due to heavy construction and separation between barrel and frame . . . moreover, manual operation is easy and fast even after long periods of idleness. Numbers of these valves are currently contracted for, yet capacity has not been reached and your inquiry is invited.

BROSIUS DIVISION

Salem - Brosius, Inc., Pittsburgh 15, Pa.

Affiliates: Salem Engineering Division, Salem, Ohio;
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COLD ROLLING STRIP

An appraisal of today's theory and practice

Experimental studies indicate the coefficient of friction of strip while in the process of reduction will vary along the contact length of the strip on the rolls. Observations of others are compared in this the third in a series on cold strip mill practice

By J. D. KELLER
Consulting Engineer and Partner
Associated Engineers
Pittsburgh

IN the author's 1942 paper,[13] the coefficient of friction of the strip on the rolls, as calculated from the few roll-force data then available and from the compressive strength of representative strip material, was found to average about 0.105. The strip speed in the mill in which the forces had been measured probably did not exceed 1500 fpm.

In those calculations, the strength values corresponded to the tensile yield strength in accordance with Siebel's original recommendation, as adopted by Trinks. Recently it has become more common to use the "yield strength with inhibited spreading," which is $2/\sqrt{3}$ or 1.15 times the tensile yield strength, and on that basis the calculated friction coefficients would be reduced somewhat below the 0.105 figure.

Coefficients Vary with Lubricant—Nekervis and Evans, in an excellent though incomplete experimental study[17] on an actual small mill in the laboratory at Battelle Institute, found friction coefficients varying with the lubricant from 0.085 for the organic acids obtained from palm oil to 0.120 for mineral oil, the average for complete palm oil being about 0.096. This was for rather low rolling speeds, about 120 to 190 fpm, and over this range the friction decreased only about 5 per cent with increasing speed.

Friction coefficients as high as these correspond to what is called boundary lubrication rather than to true oil-film lubrication, at least over the greater part of the contact length of the strip on the rolls. It has been shown fairly conclusively that in boundary lubrication the surfaces, or at least those parts of the surfaces which are closest together and carry the greater part of the load, are separated by only a few layers of molecules of oil, which molecules are oriented with their long axes at right angles to the solid surfaces, like the pile on a carpet (Fig. 12).

To be effective for boundary lubrication, the oil molecules or at least some of them must be polarized molecules such as those of the fatty acids, of which palmitic acid, an important constituent of palm oil, is one. These molecules have at one end a polar group of atoms, the carboxyl or (COOH) group, which attaches itself firmly to the metal surface by its chemical bond, as indicated in Fig. 12 (due to G. Karelitz[18]). Not only in the layer immediately

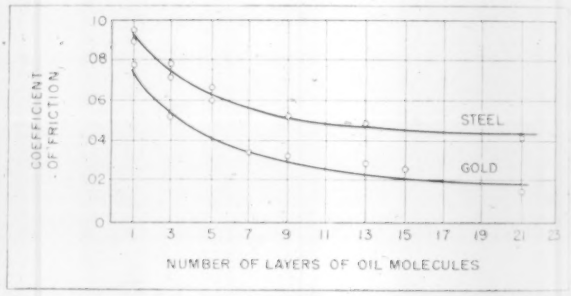

Fig. 13—Decrease of friction with decrease of number of layers of oil molecules, in boundary lubrication. (Claypoole and Karelitz[16])

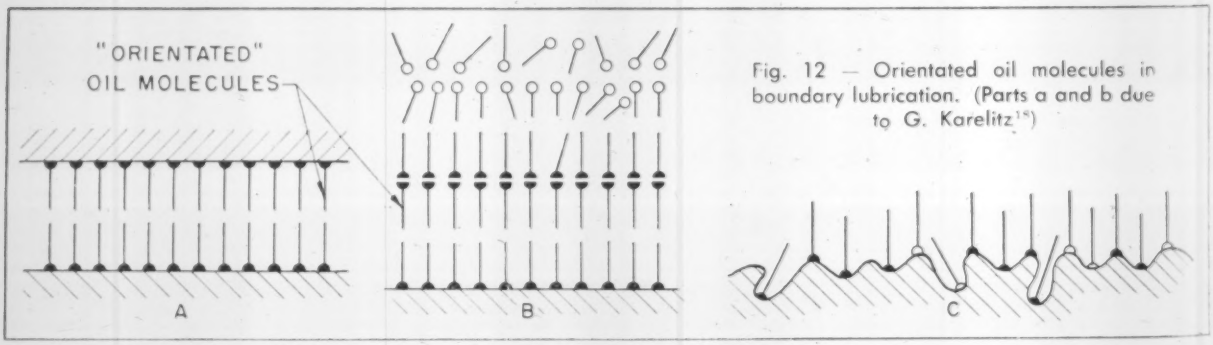

Fig. 12 — Orientated oil molecules in boundary lubrication. (Parts a and b due to G. Karelitz[18])

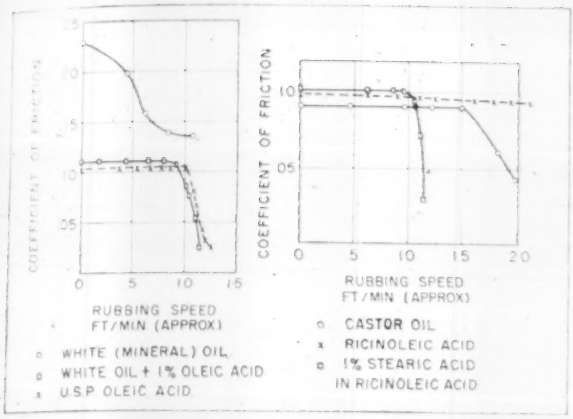

Fig. 14—Effect of rubbing speed on coefficient of friction, in boundary lubrication. (Beeck and associates[20])

in contact with the metals are the molecules "orientated," as in Fig. 12-a, but also in adjacent layers; the orientation gradually disappears in the layers further away from the metal, as shown in Fig. 12-b. If the pressure is not excessively high, the metal surfaces are held out of contact by the upstanding oil molecules, the layers of which slide over each other when relative parallel motion of the surfaces occurs.

Actually, the surfaces are not perfectly flat, but wavy and porous, somewhat as shown exaggerated in Fig. 12-c (see also Figs. 15 and 16) and it is evident that those molecules adhering to the high spots are most likely to be rubbed off by the opposing solid surfaces, while those adhering in the pores or cavities will be difficult to drag out; in fact, they form a reserve supply of lubricant, since even if dragged out of the cavities they may re-attach themselves to the higher parts of the surfaces.

So long as pure boundary-lubrication conditions prevail, the coefficient of friction should not vary with the velocity of sliding, and Bowden and Leben[19] found this to be the case; for smooth steel surfaces covered with films of fatty acids of molecular weight about 120 or greater, under pressures not definitely stated but apparently very high, they found that the coefficient of friction remained constant at about 0.095 to 0.105, over a range of sliding speeds from 6 to 1200 fpm. This was for films on the surfaces no thicker than about 50 layers of molecules, no oil bath or other reservoir of oil being present. For mineral oils (paraffins) they found much higher friction coefficients, 0.23 to 0.14.

Break Through of Oil Molecules Occurs—Bowden and Leben found that a single layer of oil molecules soon wears off during sliding, but 50 layers may last very long, although eventually all are broken through unless a reservoir of lubricant is present which can replenish the layer. When the layers break through, metallic contact occurs, with alternate welding-together and tearing-apart of the high spots, resulting in flash heating of the surfaces to as high as 900° F or over, and in the stick-slip type of sliding, with increased friction coefficients. Nekervis and Evans found, under the microscope, evidence of the craters formed in the surfaces of their rolled strip by this spot welding and tearing apart.

Claypoole's experiments as reported by Karelitz[18] showed that, in boundary lubrication, the friction coefficient decreases regularly as the number of "orientated" oil molecules is increased, as shown in Fig. 13, up to about 13 layers, beyond which there was no further decrease.

Finally, O. Beeck[20] and his collaborators found definitely that, as the speed of sliding of smooth steel surfaces, in an oil bath and under high pressures, is decreased, at a certain low speed (1 fpm) the coefficient of friction which had been low, increased abruptly to about 0.085 to 0.11, depending on the lubricant, and remained constant at all lower speeds and even under static conditions, as shown in Fig. 14. Presumably, when the speed instead of being decreased is increased from zero, the friction coefficient would follow the same form of curve, though the abrupt drop with increasing speed might occur at a somewhat higher speed than the abrupt rise with decreasing speed.

To explain this effect, it is necessary again to consider the nature of the supposedly smooth metal surfaces. Fig. 15 shows a photomicrograph of the actual contour of a finish-ground steel surface having root mean square roughness of about 35 microinches, at a magnification of 750X. The peaks or ridges are conspicuous. Even a highly polished steel surface is actually covered with waves and ripples, as brought out in Fig. 16, obtained by oblique illumination from a small concentrated light source. Evidently, contact of two adjacent surfaces could occur only on the tops of the highest waves, unless these were crushed down by pressures much exceeding the yield strength of the steel. But with boundary lubrication, even the high spots are kept out of contact by the orientated

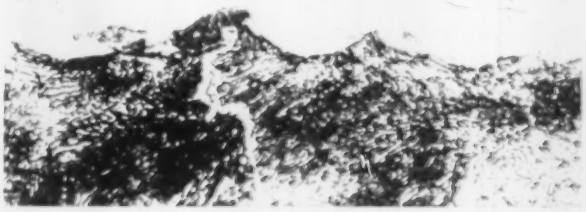

Fig. 15—Contour photomicrograph of finish-ground steel surface, root mean square roughness approximately 35 microinches, magnification 750X. (Courtesy of Chrysler Corp., Ray Hewlett)

oil-molecules adhering to them; while in the valleys between the peaks, there is a relatively large reservoir of oil, since in a waviness of only 0.00001-inch, there is still room for 100 to 300 molecules of oil. The rounded or sloped sides of the hills form minute oil wedges, and as the rubbing speed is increased, more and more oil molecules are drawn in, so that true film lubrication can occur over at least the lower slopes of the peaks, with true boundary lubrication (which, however, takes most of the load) only at their tops, and a mixed type in between.

Surface Activity Is Required—This wedging-in of

The latest Plate and Strip Mill by....

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MANUFACTURERS OF
ROLLS AND ROLLING MILL EQUIPMENT
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NON-FEBROUS SLAB TO
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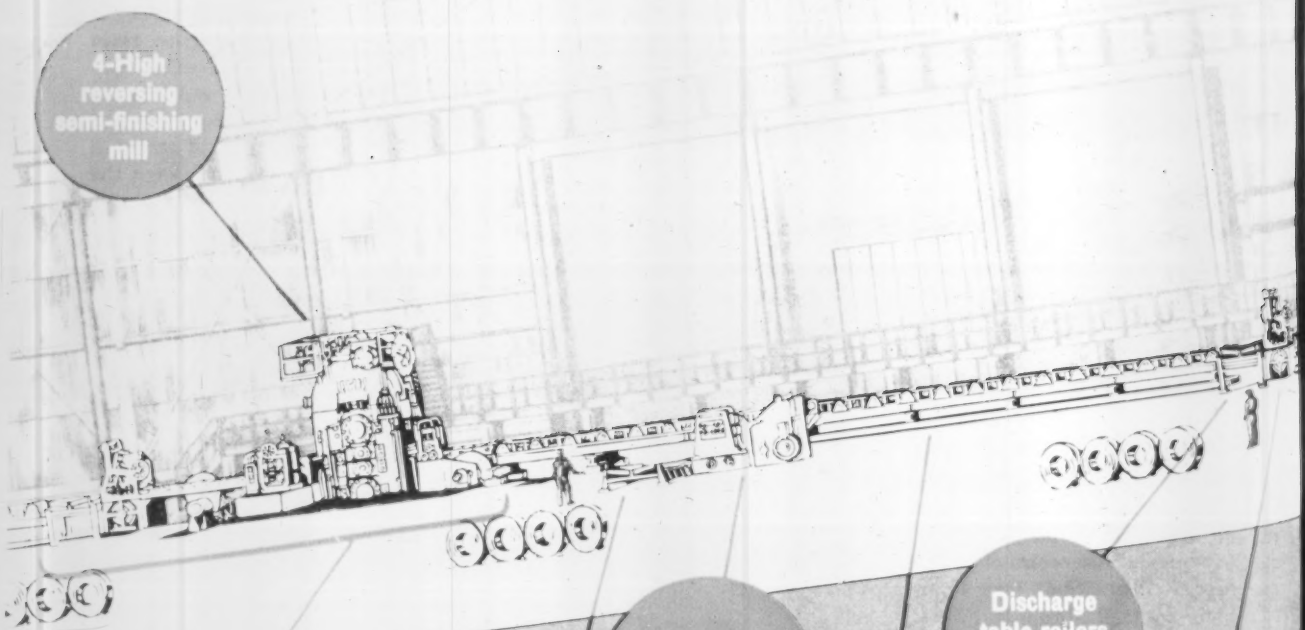
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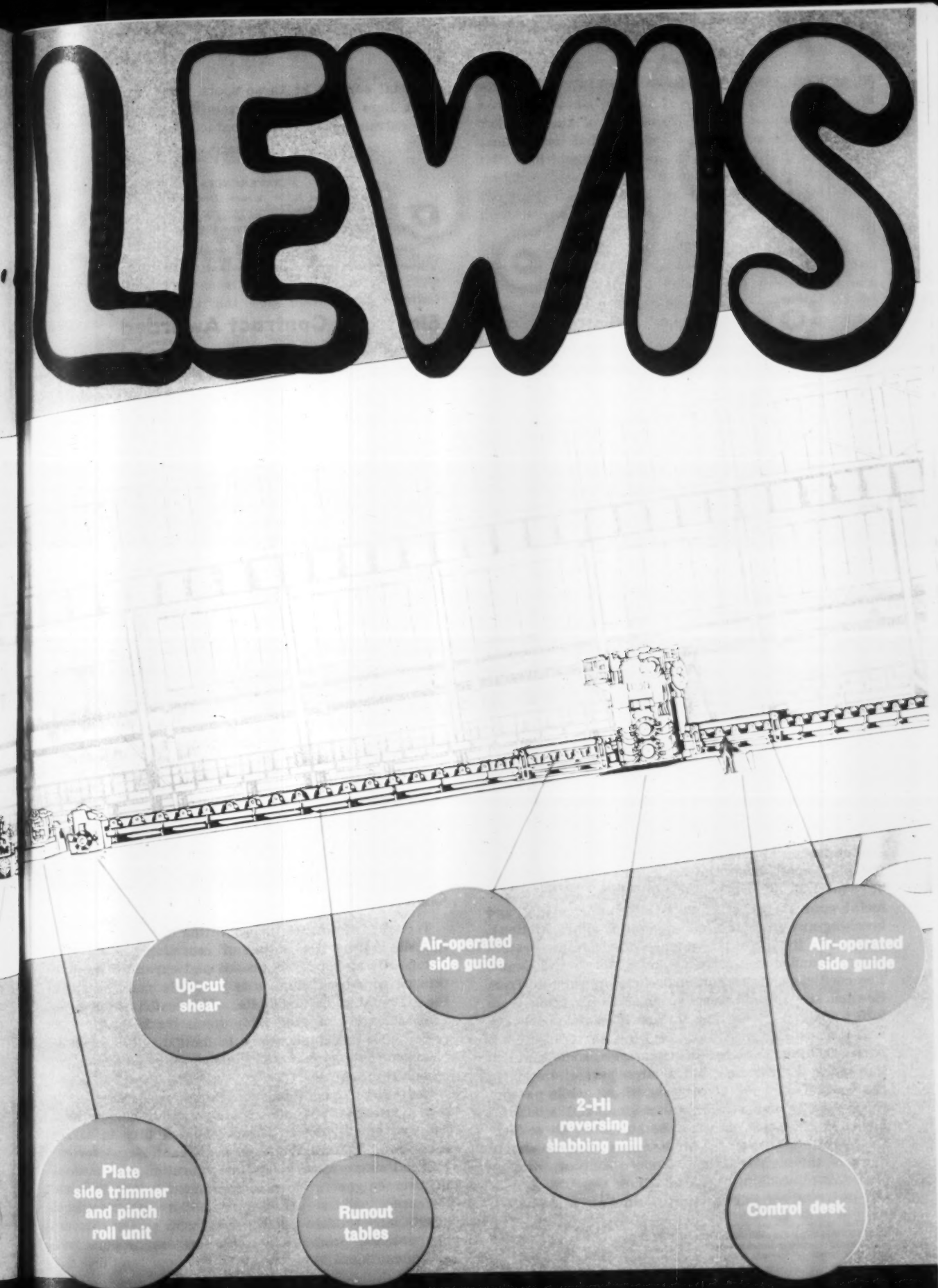

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oil, according to Beeck, is an effect which requires a certain surface activity of the oil, since the speed is much too low for the formation of the ordinary hydrodynamic oil film; he states that only those lubricants (having polarized molecules) which exhibit a high degree of orientation of their surface films, show this wedging effect at low velocities. Furthermore, the wedging effect cannot be observed with rough surfaces.

From all this, it seems probable that in strip rolling, the friction coefficient will not be constant but will vary along the contact length of the strip on the rolls. For normal cold-reducing practice, with fairly smooth surfaces of both work-rolls and strip,

Fig. 16—Ripples in highly polished steel surface brought out by oblique illumination from small concentrated light source. Rms roughness of surface, less than 10 microinches. (Courtesy of General Electric Co., O. R. Schurig)

and palm oil lubrication, at the beginning of contact where the high spots of the strip surface have not yet been squashed down, the surfaces are covered with a multilayer film, the sliding speed is high (it may reach 1000 fpm if the strip speed is 4000 fpm), and plenty of oil is retained in the low spots or valleys of the surface from which the films can be repaired by the wedging action; at that place the friction coefficient is probably as low as 0.01. But further along in the contact length, the speed of sliding decreases regularly, becoming zero in the no-slip region, while the pressure becomes excessive; more and more of the high spots have the attached oil layers rubbed or squeezed off them, allowing localized metal-to-metal contact to occur, with alternate welding and breaking-away of the metal ("stick-slip" friction), producing in the strip surface the minute craters observed under the microscope by Nekervis and Evans. The coefficient of friction in this region, judging from Bowden and Leben's results, could be anything from 0.10 to 0.25.* Beyond this, toward the exit or delivery end, it is harder to conjecture what the friction will be; the sliding velocity again increases somewhat (in the opposite direction), but a large part of the oil in the voids must have been squeezed out while passing through the highest-pressure region, and what remains in the pores may not be sufficient to re-form the orientated layers*; furthermore, the squashing down of the high spots may leave a contour unfavorable for oil-wedging, besides which the presence of the torn craters will certainly mean continued metal-to-metal contact at those spots. The friction coefficient here will almost certainly be higher than at the entrance end of the contact length.

(To be continued)

* That palm oil does remain in the pores of the metal, even after passing through the extreme-pressure region, is shown by the necessity for special cleaning means (electrolytic or other) to remove the oil before the strip is tinned.

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19. F. P. Bowden and L. Leben, Phil. Trans. Roy. Soc., v. 239, (1940), pp. 1-37.
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Electrical Contract Awarded

Electrical equipment necessary for the expansion of Plantation Pipe Line Co.'s system was awarded to Westinghouse Electric Corp., Pittsburgh. C. R. Younts, Plantation's president, says the $600,000 contract provides for switchgear, motor starters, control centers and ventilating fans. The additional equipment and pipe line will boost the system's capacity from about 100,000 to 167,000 barrels per day.

The original line consisting of 12 and 10-inch pipe from Baton Rouge, La., to Greensboro, N. C., with lateral lines to Birmingham, Columbus and Macon, Ga., and Knoxville, Tenn., was built in 1941 and used Westinghouse equipment for pumping at all its 31 stations. Expansion of the system to provide for a parallel 18-inch line to Bremen and a 14-inch line eastward to Charlotte, N. C., can be accomplished without adding new motors. Additional horsepower for the line's expanded activities will come from 20 of the original 60 explosion resistant 600 to 900 hp motors. Pumping stations on the present line are located at 30-mile intervals and these will be raised to 60 miles. This will drop the line's capacity from 100,000 to 67,000 barrels per day but the extra motors placed at 120-mile intervals on the new line will provide that line a 100,000-barrel per day capacity. Also if the need arises additional motors on the new line resulting in 60-mile intervals would raise the entire system's capacity to 221,000 barrels per day.

Centrifugal Casting Data

Technical literature incorporating detailed information on modern techniques of centrifugal casting in permanent molds for improved and expanded production of cylindrical shapes is available from Lebanon Steel Foundry, Lebanon, Pa. The leaflet emphasizes that wider use of high alloy steels for heat and corrosion-resistant applications is limited only by available fabricating methods and necessary defense materials restrictions.

Centrifugal casting is adaptable to the production of a variety of cylindrical and circular shapes in a wide range of alloys. Special adaptability to alloys capable of withstanding the heat, centrifugal forces, thermal stresses, corrosion and vibration encountered in aircraft gas turbines is mentioned in the booklet. Reference tables are supplemented by drawings, charts, and product photographs, with sections covering process, properties, design factors, applications and advantages.

Thread Repair Time Cut With Helical Inserts

TIME requirements for replacing stripped and worn screw threads in castings can be materially reduced by using stainless steel helical-wire thread inserts. The inserts, made by Heli-Coil Corp., Long Island City, N. Y., permit the use of the same size cap screws in the repaired holes that were used in the original heads.

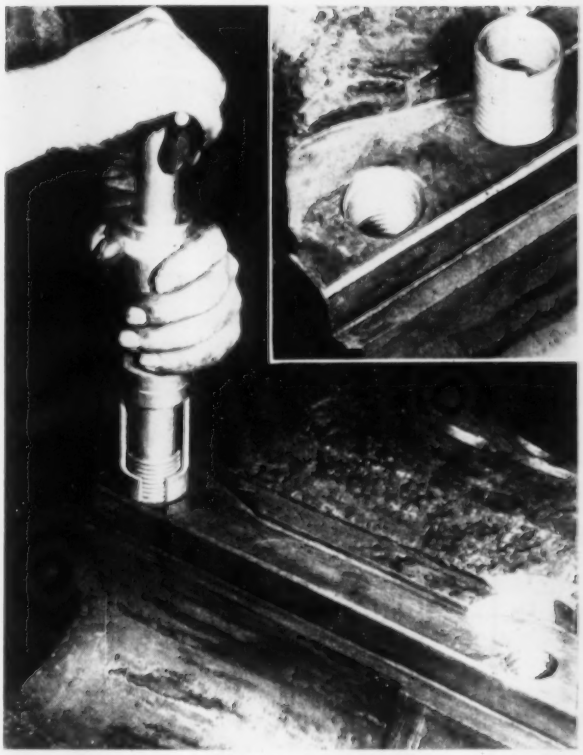
Matching operations that would be necessary if oversize threads and cap screws would be used to solve the damaged thread problem are eliminated. Nor is it necessary to drill out larger holes in mating parts. In addition the preformed inserts provide threads that are stronger, more wear resistant and more corrosion resistant than the original threads.

No Strength Loss—Superior strength of the 18-8 stainless steel used more than compensates for the loss of material in the bolt hole boss. Increased loading strength is achieved because helical insert automatically adjusts itself to mating threads on both casting and stud, thereby distributing the load properly over each thread.

Here's how the repair job is done: Damaged thread is cleaned out with a drill slightly larger in outside diameter than the major diameter of the original thread. Hole is retapped using an oversize, special-threaded tap. Helical thread insert is installed.

Repairs made in axle cap bolt holes or subway car motor frame casting by a New York subway line are shown in the accompanying illustrations. The casting had a badly worn thread, a completely stripped thread and a broken 2¼-inch cap screw. Original holes had 1 9/32-7 tapped threads.

Three Step Job—Three steps were taken following removal of the broken stud: 1. Holes were drilled out with a 1 21/64-inch drill, 2. a special oversize Heli-Coil tap identified with a 1 9/32-7 marking was used to tap the holes, and 3. a thread insert was installed to bring the hole back to size. Insert has a diamond shaped cross-section with threads on the outside conforming to the special tap and internal threads conforming to the original thread.



Maintenance man installs a Heli-Coil insert using a high-speed inserting tool. In the inset is a threaded insert installed in the casting, half a turn below the surface, and an insert to be installed in one of the remaining threaded holes

Entire operation was completed in about 55 minutes. Smooth threads permit frequent assembly and disassembly with a minimum of thread wear. Corrosion caused by infiltration of water and other reactive liquids and gases will not deteriorate the threads.

Voltage Fluctuations Eliminated

Voltage variations that adversely affect the efficiency of many operations in plants can be practically eliminated with constant voltage transformers, reports Sola Electric Co., Chicago. This is the cheapest and quickest way to overcome the trouble as in most cases the difficulty occurs within the building and a complete rewiring job would be too expensive and consume tremendous amounts of scarce materials.

A survey by the company shows: Voltage variations are common and no area is exempt from the difficulty, fluctuations of as much as 30 per cent are not rare, power companies are seldom to blame and excessive high or low voltages cause specific problems in almost every business. Power companies already control voltage as well as or better than the law requires. Wiring systems within plants, however, in many cases have not kept pace with increasing electrical loads and that is where the trouble lies. The company's constant voltage transformers can control voltage at an individual machine within plus or minus 1 per cent of the desired level.

Copper Brazing Paste Improved

Four advantages for copper furnace brazing operations are offered by a new type of Cubond, Glidden copper brazing paste. Features include increased savings in manpower, stronger brazed joints, savings in the amount of copper necessary and reduced fluidity of the brazing material. Containing a small amount of iron, the brazing paste was developed by Glidden's Metals Refining Co. Division in Hammond, Ind.

Increase in the strength of brazed joints is a result of the more sluggish molten brazing metal, which improves the filleting of joints and eliminates the notch effect. As much as 50 per cent savings in copper are reported in the refrigeration and automotive industries.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" BRASS CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND. — IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

Good Tools and Methods Ease Machining of Copper, Bronze

The broad use of copper, phosphor bronze and other high-copper alloys pose a problem to products, methods and tool engineers in the electronic field from a machinability standpoint.

Oxygen-free copper, for example, has one of the lowest machinability ratings of any of the copper products, yet precision dimensions and high finishes are expected. At the same time, the mounting preparedness program calls for high production.

On much of the electronic production, the use of sulphur in the coolant-lubricant is ruled out due to its attack on the metal with subsequent discoloration. Sulphur-free mineral oils and soluble oils are employed. Normally, when using a soluble oil, the 20-1 ratio of water to the oil is cut to 10- or 15-1 since lubrication is a greater factor than cooling with the lowered surface speeds and feeds used on copper and high-copper alloys.

Controlled Coolant Important

Of utmost importance is a well-directed, heavy supply of cutting compound. Care must be taken to insure the stream hitting the tool and the work and not splashing off into space. Sometimes a lower pressure will be the answer, as well as using two or more streams.

In drilling and tapping the cutting compounds should be so directed as to wash away the chips.

Carbides Reduce Problems

The use of carbide tools is strongly advised not only from the standpoint of longer tool life and increased speeds and feeds but from the finish requirements. They will more than pay for themselves in reduction of downtime and good results.

Tungsten carbide does not "load" up as rapidly as tool steels when machining copper. On highly ductile metals, rake angles of 2-8 degrees are normally recommended with clearance angles of about 7 degrees. However, these angles should be held to the lowest point possible to give added

Phosphor bronze terminals for micro-wave equipment turned in Swiss screw machines.

strength to the cutting edge yet carry the chip away. Tools should be set on center or slightly above rather than below the centerline of the work. Too large a radius will cause chattering and too small is likely to produce a threaded appearance.

Surface speeds of 200 to 300 feet per minute can be used depending on the depth of the cut. On finishing cuts, care should be exercised in the amount of stock left for the finishing tool. Sufficient metal must be left to permit the tool to cut rather than drag the chip off.

Hard-Chrome Plate Helpful

Fast spiral drills, polished and hard-chrome plated, give excellent results, especially from the standpoint of chips welding to the cutting edges.

Carbide inserts have also proved worthwhile in producing good finishes with drills.

In chasing threads, cemented carbide has also helped to improve tool life as well as finish and accuracy of threads. Some concerns have used high-speed chasers which have been chrome plated.

Much has been written on the choice of taps for copper and the high-copper, non-leaded alloys.

Polished Flutes Suggested

Two things are pretty much agreed upon: polished flutes and chrome plate. Not only is welding reduced but the frictional load is diminished.

On through holes, "gun" or "chip driver" taps are normally recommended. On blind holes, except when there is sufficient clearance between the tap and the bottom, chip drivers should not be used. Either two or three or four flutes are normally selected.

Tap breakage can result from running a tap too slowly or through dullness. Sharp taps are essential.

Machining of phosphor bronze rod for various terminal pins and connectors of both male and female types in Swiss screw machines is generally done with cemented carbide tools. High finish, concentricity and accuracy are normally required in these parts.

Flat Carbide Drills Used

Surface speeds between 200 and 300 fpm. are used. Flat drills of solid carbide are generally preferred to twist or fast spiral drills. Finishes with flat drills usually are equivalent to a reamed hole on this small work.

In cutting copper and phosphor bronzes, rigidity of tools and machines is important to eliminate chatter and "hogging in" and to maintain dimensional stability.

Cleanliness Essential for Plating

The majority of parts in micro-wave equipment is silver plated. Cleanliness is about half the battle in obtaining an intimate bond between the base metal and the silver.

Many types of cutting compounds are difficult to remove thoroughly. It is advisable to consult cleaner supply houses on the best method to remove the specific coolant.

Not only does an unclean surface on the base metal lead to blistering, flaking and peeling, but the plating baths may be contaminated.

Thorough rinsing after cleaning and plating is imperative. Failure to rinse after plating may lead to staining as will failure to dry the parts after rinsing.

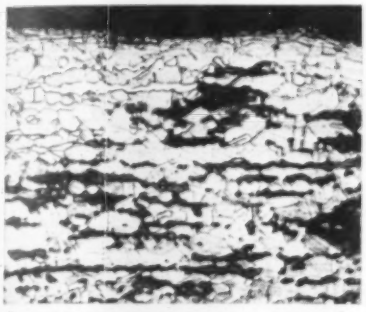
Solid sintered carbide flat drill used in automatic machines on phosphor bronze.

CAUSES OF CORROSION

This article is one of a series of discussions by C. T. Bulow, research chemist of the Bridgeport Brass Company.

DEZINCIFICATION CORROSION (Cont'd)
Beta Phase Attack

In the two phase alloys (Alpha and Beta) such as Muntz or Naval brasses which contain about 60% copper and between 39 and 40% zinc, dezincification may be concentrated initially on the Beta phase. If the attack spreads to both Alpha and Beta phases, complete dezincification may result with the formation of a layer of porous copper which can be peeled or pulled from the surface of the brass.



"Beta-Phase Dezincification" is recognized by darkening of elongated Beta phase. Note unattacked light colored Beta phase in upper left-hand section of photomicrograph. Mag. 75X.

In the photomicrograph, the dark elongated phase is the dezincified Beta while the light elongated phase is the unattacked Beta. The extensiveness of the dezincification of the Beta phase in this instance was sufficient to mechanically weaken the metal.

Where the dezincification type of corrosion is concentrated on one phase of a polyphase alloy, the attack occurs in that phase which contains the highest proportion of the more active element. In Alpha-Beta brass, the original Beta phase may contain as much as 40% zinc and 60% copper while the Alpha phase may contain as little as 35% zinc and 65% copper.

Simple Tool Eliminates Burrs on Pinion Stock

Elimination of secondary operations such as burring, drilling, milling and sawing by careful tooling in the primary screw machine work is necessary to lower the end cost of a product.

Burrs thrown into the teeth of gears cut from brass pinion stock when forming hubs and cutting off have always been a problem.

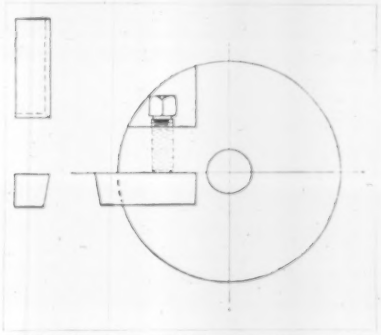
This trouble has been eliminated by manufacturers by using a carbide tool bit inserted into a holder made from a circular forming tool.

Side and front relief angles of 8-10 degrees were ground on the bit. This prevented rubbing on cutting faces.

Forming Tool Revamped

The tool holder was made from the circular forming tool.

Resharpening of the tool bit was simply a matter of grinding the top of the bit, whereas on a circular forming tool additional grinding would have been necessary. The cutoff tool also has substantial front and side relief angles.



Carbide bit and tool holder made from circular forming tool. Ease of grinding front and side relief angles and burr-free teeth on pinions was possible with this type of tool.

Where only a light feather burr is involved and tumbling is impractical, a bright dip of 25% nitric acid, 60% sulphuric and 0.2% hydrochloric and the remainder water will remove the burr and sharp edges. This procedure is used extensively in the watch and clock industry, especially on feather burrs due to blanking, or milling gear teeth.

Parts must be thoroughly rinsed after dipping to prevent discoloration and further attack. (6443)

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Automatic Positioning Device eliminates manual machine settings. Electrically operated device provides settings within 0.0002 to 0.0005", controlling fine feed movements without need for final hand adjustments. Designed for table-type machines, device consists of two control units, one for lateral setting of table on saddle and the other for vertical setting of headstock on machine column. **No. 1129**

Hardness Tester automatically tests, indicates and certifies sheet metal parts. Any Brinell, Rockwell or Vickers numbers can be set by conversion table. Device consists of impressor needle which moves up and down on anvil. Pieces are fed between needle and anvil. When needle point contacts part, dial reading is visible and green light flashes if piece is of desired hardness. Stamp then certifies piece automatically and counting device registers total number inspected. **No. 1130**

Boiler Water Treatment is said to combine advantages of chemical and colloidal methods for effective removal and prevention of scale formation. Coagulant aids in elimination of pitting, congestion, rust, foaming and priming in steam boilers. **No. 1131**

Stud Driver-Remover employs interchangeable collets for wide range of stud sizes. Stud is driven by pitch diameter pressure, driven by power tool or operated manually by T-handle. Length of grip on stud is adjustable, and release of grip is accomplished by reversing direction of drive. Tool can be locked on stud when used as a stud remover. **No. 1132**

Portable Thickness Gage for checking sheet and strip stock. Jeweled dial indicator can be furnished with direct reading dial for sorting purposes or with continuous reading dial for checking plating thickness. **No. 1133**

Flow Switch indicates flow, no-flow, or direction of a liquid through pipe. Magnetically coupled unit is said to be suitable for induction hardening machines, spot welders, grinding machines, etc. Approximate size is 6 x 3 x 2", weight is 1½ lbs. Standard unit is provided with ¼" IPS male fittings, will signal when flow is below 1 gpm. **No. 1134**

Pulling-Lifting Tool is said to handle all types of hoisting and pulling operations. It is adaptable for work positioning, hoisting, stretching and moving. The portable tool, operated like a wrench, is available in capacities of ¾, 1½ and 3 tons. Self-acting brake can be support load at any point in lifting action. **No. 1135**

Multiple Hole Punch provides a simple method of punching holes in sheet metal parts by permitting set-up to be made outside the stamping press or press brake. Individual punch and die units are interchangeable. Two types of assemblies, box-type and twin plate, are available. The former can be set up for punching parts up to 21" x 23", and the latter accommodates parts up to 44" x 92". **No. 1136**

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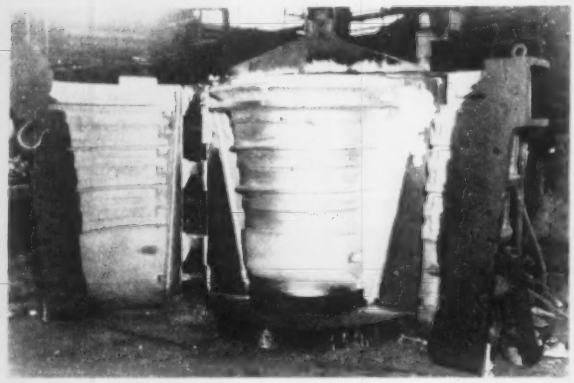
500-Pound Aluminum Casting Produced in Permanent Mold

SUCCESSFUL production of permanent-mold aluminum casting weighing 500 pounds has recently been announced by John Harsch Bronze & Fdry. Co., Cleveland. The total production run on this unit is much smaller than that normally considered minimum for permanent-mold production. Nevertheless, Harsch engineers say that to produce it by this method costs only a fraction of what it cost to produce as a sand casting. The accompanying illustration shows a completed casting ready to be ejected from the mold.

Originally the company began casting the part in sand. Because of the large size of the unit, this operation occupied four bays in the foundry. The use



of a large sand slinger was required in preparing the molds. Seven men could produce only four units a day.

To develop the required strength in the cast metal, the entire inner surface of the unit must be chilled. To accomplish this in sand casting required the use of a large number of iron "chills" placed close together in the mold. This resulted in a rough surface that was very difficult to machine.

To produce the unit as a permanent mold casting, a mold of cast Meehanite weighing nearly 10 tons was constructed. The mold is 65 inches high and has an average diameter of about 46 inches. It is constructed of hinged sections which ride on rollers to facilitate opening and closing. Rows of gas burners surrounding the mold maintain it at uniform temperature for optimum pouring conditions.

The permanent-mold method produces high strength castings with smooth surfaces which are easier to machine. Only one bay in the foundry is required for the permanent-mold operation, and four men can produce 12 units a day.

Program Saves Welding Electrodes

A program for the conservation of spot welding electrodes developed by P. R. Mallory & Co. Inc., Indianapolis, conserves copper while still providing customers with dependable spot welding electrodes. Research engineers developed a process for brazing onto a used electrode shank a new nose of the same class of material. The Nu-Tip process employs a silver solder which provides a bond of high melting point, high strength and low electrical resistance. Loss of electrode hardness due to brazing is held within an unusually low limit.

Company reports that in comprehensive offset welding tests, electrodes have run 30,000 welds and withstood repeated applications of 2000 pounds of force at an angle of 30 degrees. The noses employ the fluted water hole for more effective cooling.

Selenium Rectifier Welders Cut Fabrication Costs

Diesel fuel savings of 70 per cent and maintenance savings of 85 per cent resulted from the use of selenium rectifier welders during erection of a 2 million-gallon water tower for the city of Niagara Falls, N. Y. Fuel savings were made possible by the use of one diesel-driven 60 kw generator to supply power for eight Westinghouse type RA 400-amp selenium rectifier welders. Formerly, eight separate 35 hp engine-driven welding generators were used. Maintenance required on the single diesel engine was approximately the same as that required on each of the eight units previously used.

The diesel engine used to drive the generator supplying power to eight welders required 33 gallons of fuel per day. At 10 cents per gallon, the daily fuel costs ran $3.30. Previously, each of the single engine-driven welding generators required 15 gallons of fuel per day. For eight machines, a total of 120 gallons was required—or $12.00 per day for fuel.

These savings are partly attributable to the low standby power required by the selenium rectifier machines, since less fuel is consumed during idle time. In this erection job the welding duty cycle was relatively low.

The single engine-driven generator and the eight selenium rectifier machines weigh approximately 62 per cent less than eight separate engine-driven welding generators. This resulted in a considerable saving in handling and shipping costs transporting the equipment to the erection location. Pittsburgh-Des Moines Steel Co. erected the tower.

Crawford Hunts Subcontracts

History may not repeat itself for Crawford Metal Craftsmen Inc., Galion, O., but the company isn't just hoping for the best but is doing something about it. During World War II, Crawford was unable to obtain work after burial vault production was halted. To prevent a recurrence of this condition, it is letting other metalworking companies know about the production tools available in its shop through a booklet titled, "At Your Service."

Shears, brakes, compressed air tools, welders, painting and baking equipment are included in the equipment the company has available to do a variety of subcontracting jobs. Most of the normal work is with 10 gage steel sheets and so equipment will work best with products using about the same size sheets but the company expresses a willingness to procure necessary additional machinery if required.

Short Takes from Tool Engineers' Meeting

Authorities mull over latest techniques for machine finishing and inspection of metals

TALKING shop before the American Society of Tool Engineers last week in New York were two-score experts in the fields of metal processing, gaging, inspection and testing. From the great mass of data they presented, the following significant comments are culled, representative of the ideas advanced, suggestive of things to think about in your own plant.

♦ ♦ ♦

A newly-developed "constant-pressure" lathe which can accurately determine how difficult or how easy a metal will be to machine in actual manufacturing operates with a constant pressure feeding the tool into the work, supplied by a weight-and-pulley system. As the carriage moves, the cable pulling the carriage rings a bell with every 0.002-inch of carriage travel. **Francis W. Boulger,** Battelle Memorial Institute.

♦ ♦ ♦

Ultrasonic sound offers industry a new way to "look inside" both raw materials and finished products in inspecting these for flaws. Sounds used range in frequency from 100,000 cycles per second up to 10 million cycles or more (15,000 cycles is about the top range of human hearing.) Such high-pitched sounds can be directed along a narrow path like a beam of light. To test a steel plate, for example, the beam is directed through the plate; then if the beam strikes a hidden flaw, such as a crack in the material, part of the beam is reflected and will register on a meter. **H. E. VanValkenburg,** Sperry Products Inc.

♦ ♦ ♦

Factors involved in tapping—one of metalworking's oldest but least-understood operations — have now been accurately evaluated through precision instruments which record tapping torque. Greenfield Tap & Die has been testing tapping torques for about three years now with a new instrument developed by Greenfield and Ruge-DeForest, consulting engineers. The instrument uses bonded-wire strain gages and an oscillo-

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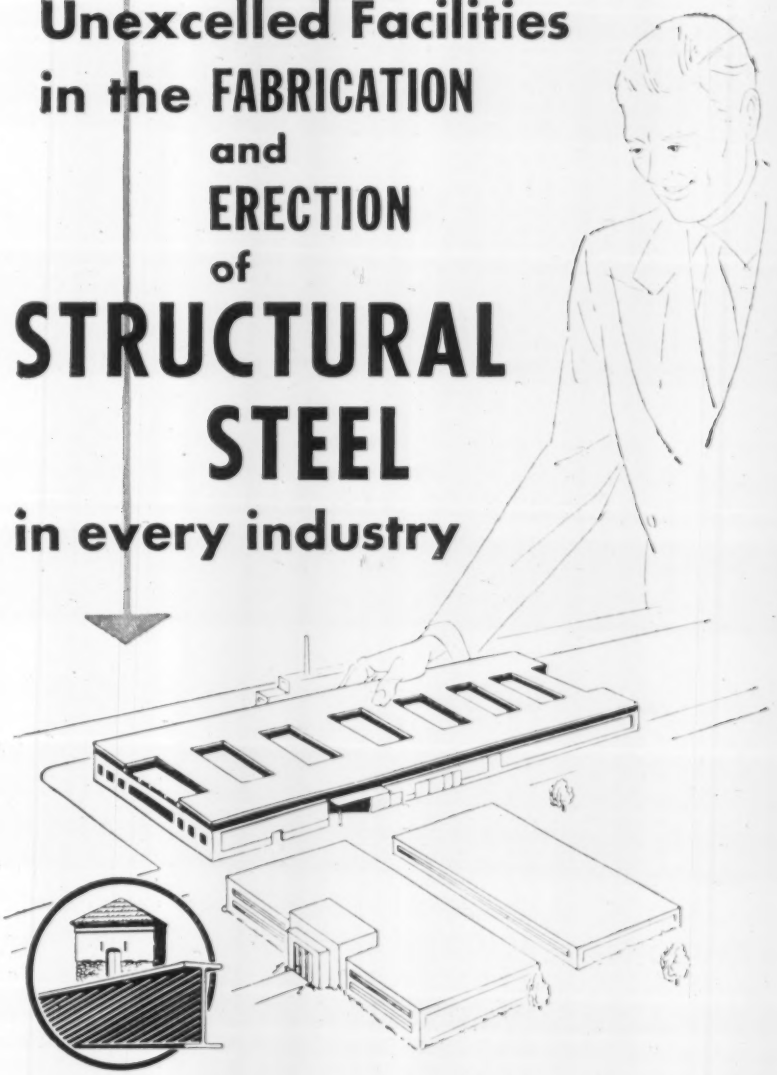

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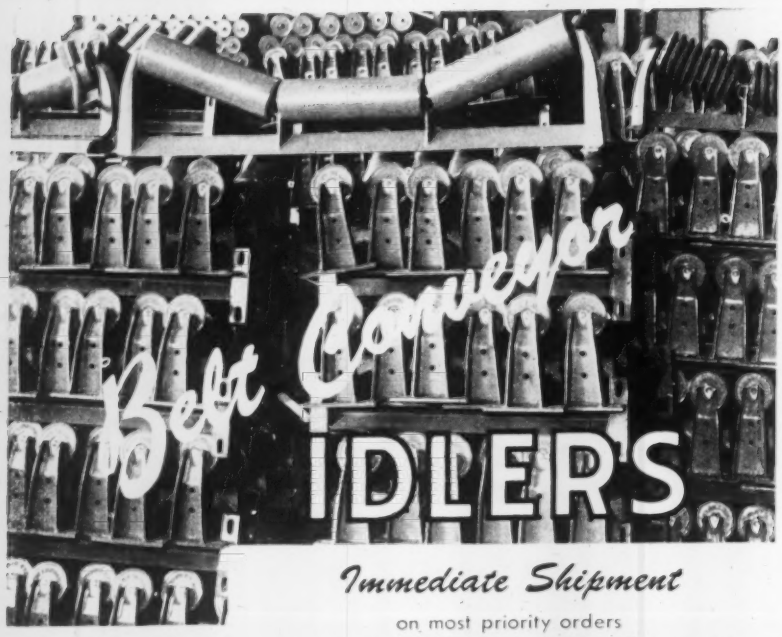

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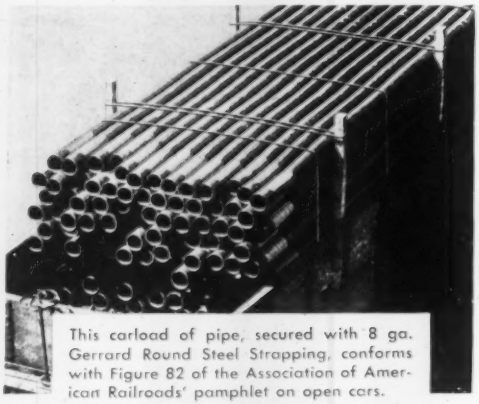

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graph to check torques entirely independent of friction, etc., in the tapping machine. **Allen J. Carruthers**, Greenfield Tap & Die Corp.

• • •

An 8-inch abrasive belt traveling at 5000 feet per minute flows 38 million cutting grits over a metal part per minute. In many instances, both production and product quality have been improved by abrasive-belt grinding. For instance, in finishing the flat surface of an aluminum die casting, an abrasive belt grinder more than tripled production. **W. A. Papworth**, Porter-Cable Machine Co.

• • •

Mechanical or electronic brains complete with memories, can now sort, measure and count much faster than can human beings, and much more accurately. The devices can employ mechanical movement, air pressure, electrical or magnetic currents, or even radioactive carbon from an atomic pile. Capable of millionth-inch accuracy, they relieve operators of the tedium of repetitive operations. Cost of such a device may range from $1000 to $50,000. **A. C. Sanford**, Federal Products Corp.

• • •

Improved processes can produce fine, mirror-like finishes on metal and nonmetallic parts at a fraction of the cost required by hand polishing. The trick is to polish large numbers of parts at one time—rather than one at a time—by rotating them in a barrel containing an abrasive or polishing medium. Abrasive mediums have grown to include dry ice, nut shells, stones, steel balls, cinders, cracked corn, ground corn cobs, sand and many other materials. Each is useful to do a different kind of job or to produce a different degree of finish. **Hubert M. Goldman**, Enthone Inc. and **Adolph Bregman**, consulting engineer.

• • •

Ordinary water in which extremely fine abrasive dust is suspended may be used for producing high finishes on both metal and nonmetallic products. Abrasives as fine as talcum powder and even finer are used, suspended in a liquid (usually water and a corrosion preventive) and the liquid is driven against the part to be finished by high pressure air. Impact of the particles removes minute amounts of metal from the surface and leaves it clean and with an attractive appearance. **B. H. Marks**, Pangborn Corp.

• • •

A new pressworking process can

save up to 15 per cent of scarce sheet steel and also accelerate production. By using mechanical hands to move the part from die to die, the new presses eliminate the conventional scrap strip and thus use nearly all the material. The new transfer presses, have been built with bed lengths up to 11 feet and are capable of up to 450 tons pressure. **Melvin and Dan Verson,** Verson All-steel Press Co.

♦ ♦ ♦

Means of isolating and confining destructive, annoying or costly machine vibrations were outlined. It is not always practical or possible to design machines that will be in balance throughout their operating life, and under any operating condition that might be imposed on them. Yet vibration originating in one machine can destroy the accuracy of other machines, contribute to wear and even cause danger to a building and its occupants. **A. P. Pfenninger Jr.,** Connecticut Hard Rubber Co. and **Donald Vance,** Korfund Co.

♦ ♦ ♦

Newly-developed methods in inspection by optical projection have made greater inspection speeds and accuracy possible at lower cost. Even a simple production part may require as many as 20 gages for its inspection, each inspection operation requiring a separate inspector. In optical projection inspection an image of the part—magnified from 10 to 100 times—is thrown onto a screen and a single inspector quickly checks it against an accurate, magnified-scale chart of its outline.

New projection methods using 1000-watt lamps make the enlarged image of the part clear and distinct even in daylight. Other advances have come from chart forms which instantly indicate the high and low limits and whether the part is within tolerance. **E. C. Polidor,** Engineers Specialties Division.

♦ ♦ ♦

Industry hasn't even begun to reach the speeds at which metals can be machined with carbide tools. New machine tools can be developed to operate several times as fast and turn out from two to ten times as much defense material per machine. The Rice Barton tests indicate that speeds at which the cutting tool moves through the steel at 16 mph or better are entirely feasible. Main requirements are machines capable of the required speed and feed combinations.

If speeds and feeds are increased even beyond the point where tools be-

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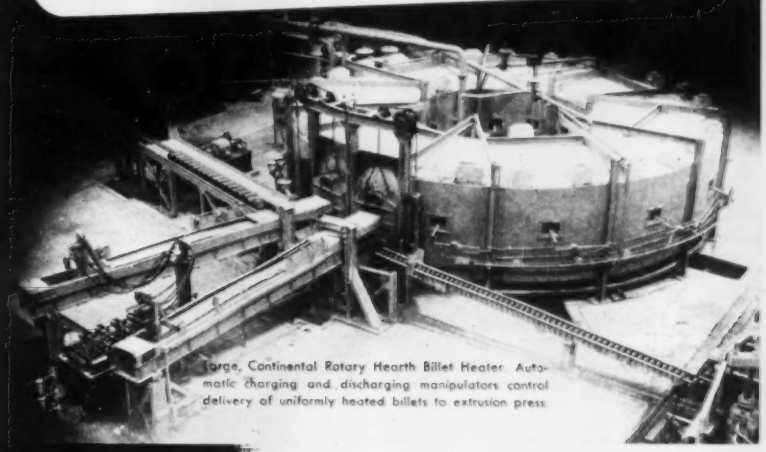

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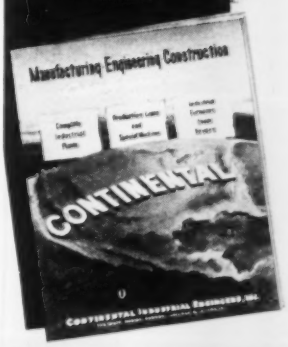

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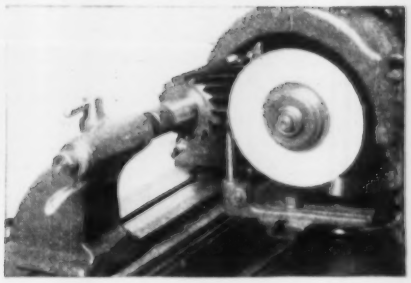
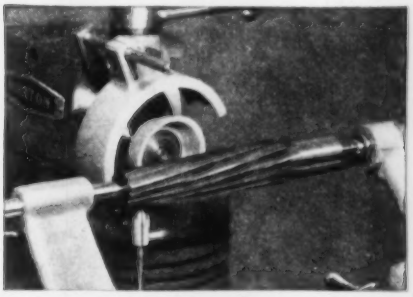
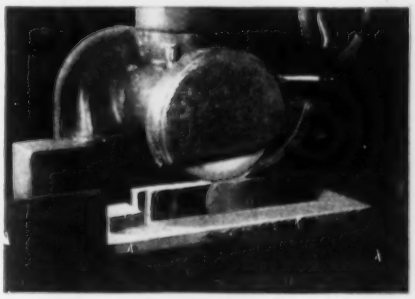


YOU SAVE TIME sharpening spiral milling cutters with Norton *New-Process* Alundum Wheels because they stay sharp and hold their size much longer than ordinary wheels.



YOU REDUCE SPOILAGE in backing off reamers with Norton *New-Process* Alundum Wheels because their free, cool cutting action does not draw the temper.



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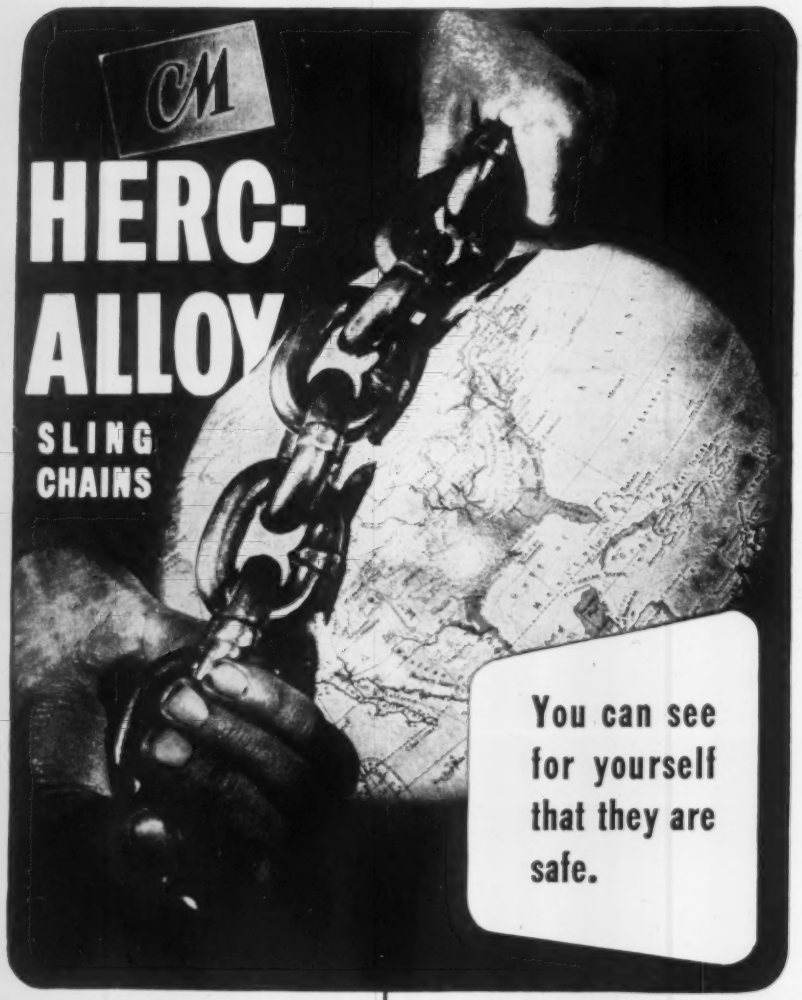

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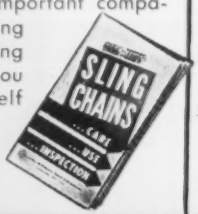

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gin to fail from the speed being too high, good tool life will return and the horsepower required will be reduced. **W. R. Coomey,** Rice Barton Corp.

◆ ◆ ◆

Productivity can be increased on older machine tools which cannot utilize the superior cutting properties of carbides. New grades of high-speed steel which contain ultra-hard carbides have been developed which will accelerate performance from such machines.

The new tool steels contain vanadium carbide and molybdenum carbide particles. These particles, particularly the vanadium carbide, range up to Rockwell 85C in hardness—as hard as the material in many tungsten carbide tools. While the average hardness of the steel is much less than tungsten carbides, the presence of the hard particles enhance tool performance and life.

The new steels allow tools to be sharpened to knife-edge keenness and comparatively sharp angles (60 degrees). This reduces the power and rigidity required in the machine tool. **W. R. Frazer,** Union Twist Drill Co.

◆ ◆ ◆

Arc welding has been greatly improved since World War II by the addition of two new methods. The new methods require the use of inert helium or argon gas. These shield the welding arc and the white-hot area of the weld from the destructive effects of oxygen.

In one production line using the new methods, welds in ¼-inch thick bronze plates are welded together with the machine closing 180 feet of seam per minute. In another case, using a tungsten electrode shielded by an inert gas, stainless steel tubes only 1/16-inch in outside diameter were welded. After welding, the tubes withstood 500 psi of internal pressure. **H. O. Jones,** Air Reduction Sales Co.

◆ ◆ ◆

Consider plunge-cut grinding as a cost-cutting, production-speeding method where close-tolerance production is involved. An outstanding advantage of the technique is the speed with which journals or bearing surfaces can be finish-ground to close tolerances. Limiting factor is the length of the journal to be ground or the spacing between surfaces to be ground at the same time. **Frank W. Curtis,** Van Norman Co.

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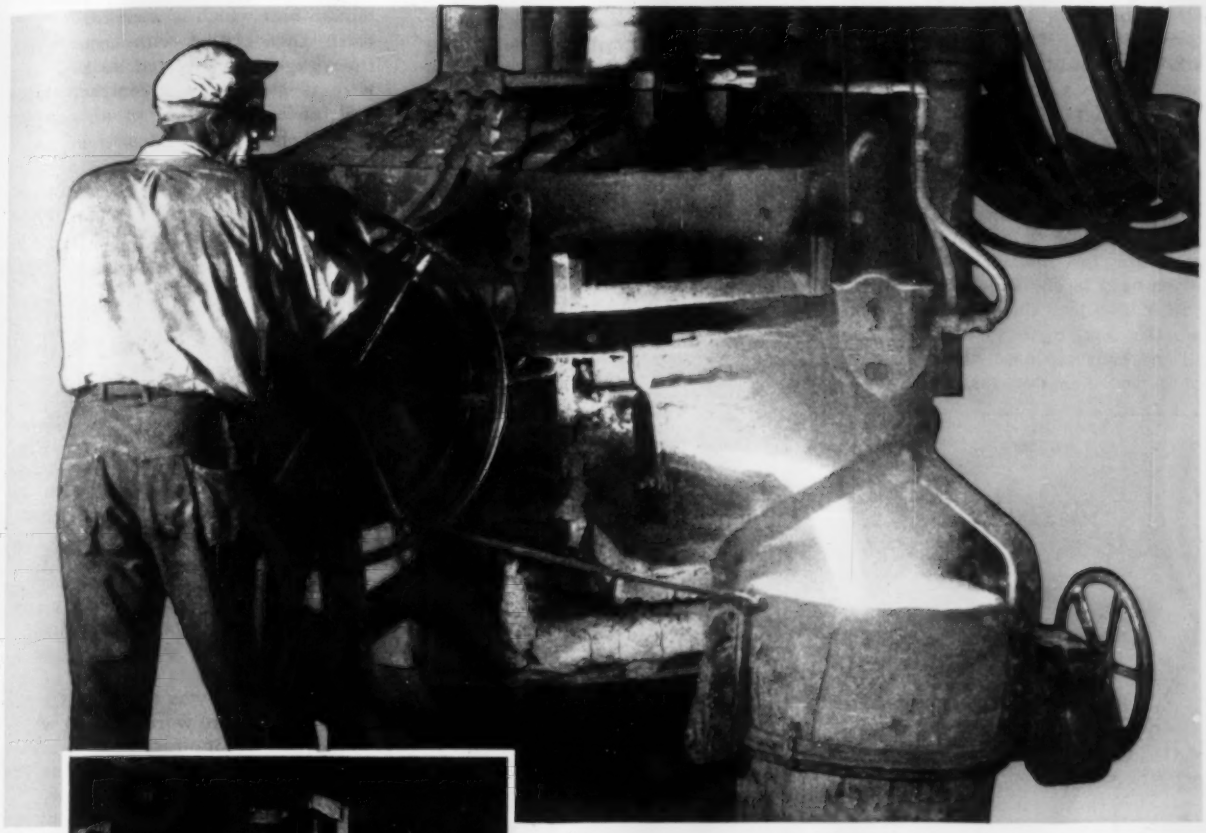
Multiple thread hobs should not only speed gear production but should



Strong, sound irons for special castings are produced in this Lectromelt Furnace at Ferro Machine & Foundry Company, Cleveland.

Nicknamed "The Drugstore" because it fills prescriptions so accurately...

"With our electric-furnace duplexing process, we are able to produce special irons for a great variety of castings requiring heat and wear resistance and ability to withstand extreme pressure... and do it economically."

In the duplexing process at Ferro Machine & Foundry Company, molten iron from the cupola is poured into the Lectromelt Furnace. There, elements are added or removed to give the exact composition specified and the charge is superheated electrically to achieve a fine-grain structure. Thus, special irons are produced as regular routine.

Lectromelt Furnaces range in capacities from 24 pounds to 150 tons, meeting every development and production requirement. They're on melting, refining, smelting and reduction work. For Bulletin No. 7, telling you more about them, write Pittsburgh Lectromelt Furnace Corporation, 323 32nd St., Pittsburgh 30, Pa.

Lectromelt Furnaces grow BIG, too.

Manufactured in ... CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2... ENGLAND: Birlec, Ltd., Birmingham... SWEDEN: Birlec, Elektkougnar A. B, Stockholm... AUSTRALIA: Birlec, Ltd., Sydney ... FRANCE: Stein et Roubaix, Paris ... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege ... SPAIN: General Electrica Espanola, Bilbao ... ITALY: Forni Stein, Genoa.

WHEN YOU MELT... MOORE RAPID *Lectromelt*

also give better tool life than single thread hobs, if correctly designed and used. Multiple thread hobs cannot increase production in direct ratio to the number of threads, due partly to machine limitations. A double thread hob will increase output about 35 per cent over a single thread hob.

Prime reason for the increased tool life for multiple thread hobs when used in climb hobbing, was the better chip load distribution obtained on the hob tooth. When multiple thread hobs are used, they should be of larger diameter than comparable single thread hobs to permit use of a larger number of flutes. Spiral-gashed multiple thread hobs are preferable to straight gashed hobs. **D. A. Moncrieff and Harry Pelphrey,** Michigan Tool Co.

• • •

A simple gaging device the size and thickness of a postage stamp can measure minute or extremely heavy loads, dimensional changes of a millionth of an inch, or temperature changes ranging near absolute zero to 1600° F.

The simple device consists of a wire one-third the thickness of a human hair which is wound back and forth, then coated with cement. If the "gage" is distorted so that the wire is stretched or contracted, its resistance to passage of an electric current is varied. Measurement of the variation tells the exact amount of stretch. The instrument will accurately measure a dimensional change of a millionth of an inch in one inch of length. **Francis G. Tatnall,** Baldwin-Lima-Hamilton Corp.

Prestressing May Extend Fatigue Life of Aluminum Alloys

Life of aluminum alloys subjected to vibration and other repeated or fluctuating stresses may be materially affected by applying stress to the material before it is placed in operation. Recent investigations at the National Bureau of Standards have shown that prestressing in some instances increased fatigue life many-fold. This was especially noticeable at lower stresses when a comparatively small number of cycles of dynamic prestress was applied. On the other hand, there were cases in which little if any improvement resulted and at some stresses the fatigue life was shortened by the prestress.

The studies were carried out by J. A. Bennett and J. L. Baker in the bureau's mechanical metallurgy laboratory to evaluate the effects of both static and dynamic prestress on the fatigue properties of structural aluminum alloys.

Stresses Are Compound—One of the difficulties encountered in applying results of laboratory tests to practical construction arises from the fact that, in many structures, the stresses vary in a random manner. An airplane wing, for example, must support not only the weight of the plane, which is a steady load, but also a fluctuating load due to vertical gusts. To approximate this situation the cumulative effect of fatigue stressing at two or more different amplitudes was evaluated, using aluminum alloy sheet specimens.

Two means of prestressing were employed. In the first, a rather high static load was applied to the specimen before the start of the fatigue test. In the second, the specimen was stressed in the fatigue-testing machine for a predetermined number of cycles at one amplitude, and then carried to failure at a second amplitude. In this way, data have been provided on the effects of both static and dynamic stress, applied prior to the fatigue test, on the fatigue properties of the material.

Conventional repeated - bending fatigue - testing machines were employed. In these machines one end

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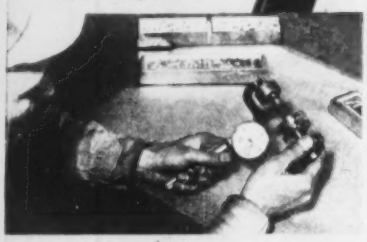
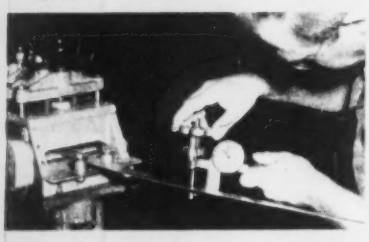
MODEL 4
For testing rounds and flats up to 4 inch capacity, in Rockwell A, B and C scales. Also made in 1 and 2 inch capacities.



Testing hardness of babbitt metal with Model S reading in Rockwell N and T scales.



Testing strip steel before fabricating — an important operation that insures against defective materials.

You'll find Ames Portable Hardness Testers being used in warehouses, machine shops, schools, on the production line, and in the field — where accurate, on-the-spot, time-saving hardness tests have to be made. No specimens to be cut off — no waiting for laboratory tests — because Ames Testers are light in weight and are carried to the work.

Ames Hardness Testers are used to determine machinability and workability of rods, strip and sheets before fabricating to prevent undue machine wear or tool breakage resulting from excessive hardness. They also are used on saws, knives, gears and large parts. A practical trouble shooter for any plant. No skill required to get accurate results. Testers come in convenient carrying cases.

More than 1500 in use.
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WALTHAM 54, MASS.

of the specimen is held fixed in a vise while the other end is deflected up and down by means of an adjustable motor-driven eccentric and crank. Design of the specimen, however, was new and was found to have several advantages over the usual type. Another innovation was a jig which measured the specimen before testing and automatically located the point at which the stress in the specimen would be a maximum.

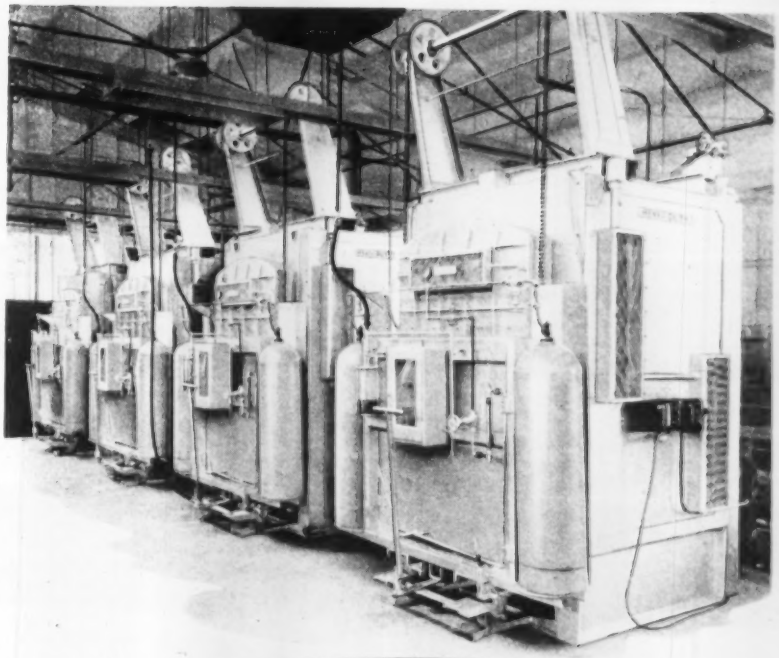
Test **Procedure** — Static prestress studies were made with Alclad 24S-T sheet and all fatigue tests with this group of samples were operated in unidirectional bending; that is, the specimen was bent in only one direction from the "no load" position. First a sufficient number of specimens was tested without prestress to give the typical relationship between stress amplitude and number of cycles to fracture for the original material. Then a static load was applied to the remainder of the specimens before starting the fatigue test. In some cases the bending load in the fatigue test was in the same direction as the static load; in others these directions were opposite.

At the higher test stresses, (25,000, 30,000, and 35,000 psi) the effect of the static prestress was negligible. However, at the test stress of 20,000 psi, there was an appreciable decrease in life for the specimens prestressed in the direction opposite to that of the subsequent fatigue stress. On the other hand, there was a slight increase in life for the specimens with a prior static stress in the same direction. The net result was a 10:1 difference in life between these two sets of specimens.

Tests for evaluating the effect of dynamic prestress were made on specimens of bare 24S-T sheet. The fatigue loading was applied in completely reversed bending. That is, the specimens were deflected equally to each side of the no-load position. The prestress amplitude was applied for a given number of cycles before the specimen was carried to failure at the test stress. Three values of prestress amplitude were used and four test stresses.

At the two higher prestress amplitudes (22,500 and 32,500 psi) fracture occurred earlier in the prestressed samples than in the original material. It seems therefore that a portion of the fatigue life of the alloy is used up by the prior stress. Within experimental error it was found that this portion was approximately equal to the ratio of the number of cycles run at a given prestress to the number of cycles which will cause failure at that stress.

For the lowest prestress, however,

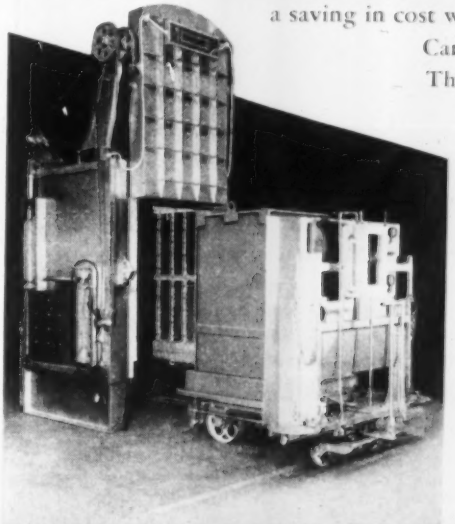


FOR INCREASED PRODUCTION OF NITRIDED PARTS USE A

HEVI DUTY CAR BOTTOM NITRIDING FURNACE

Manufacturers producing nitrided parts for aircraft, engines, and heavy machinery items have found that more production is possible at a saving in cost when they use the Hevi Duty Car Bottom Nitriding Furnace. The furnace car, complete with sealed retort and ammonia dissociation equipment can be removed from the furnace for cooling and a second car with a cold load can be inserted immediately for a minimum loss of time between heats.

Write for Bulletin HD-664



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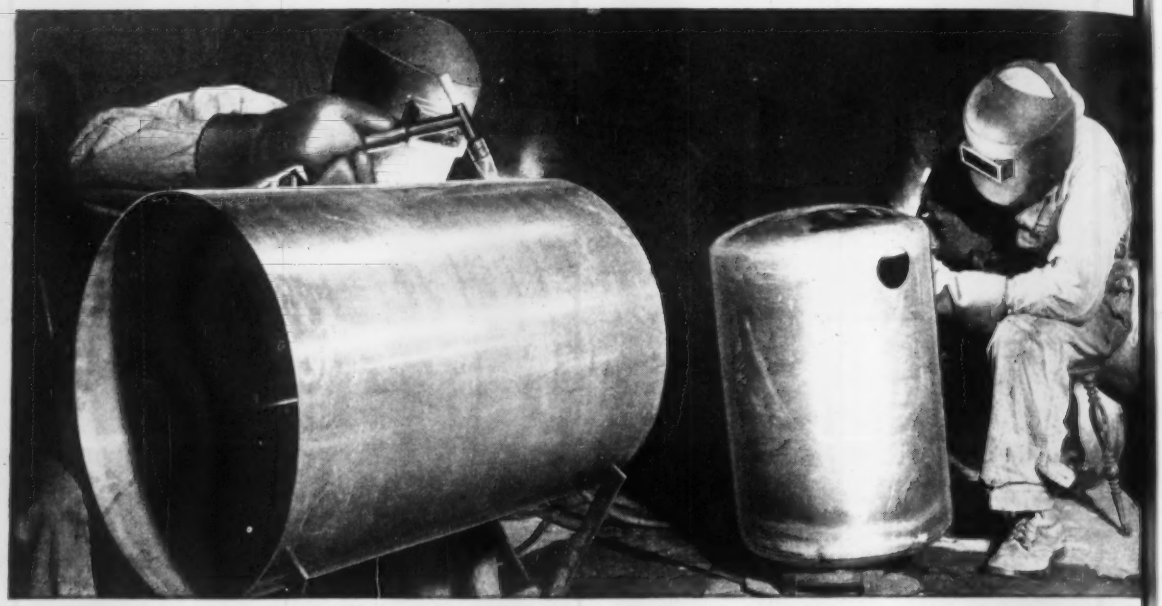
Airco Heliwelding process slashes costs...



EASILY JOINS THE "HARD-TO-WELD METALS"

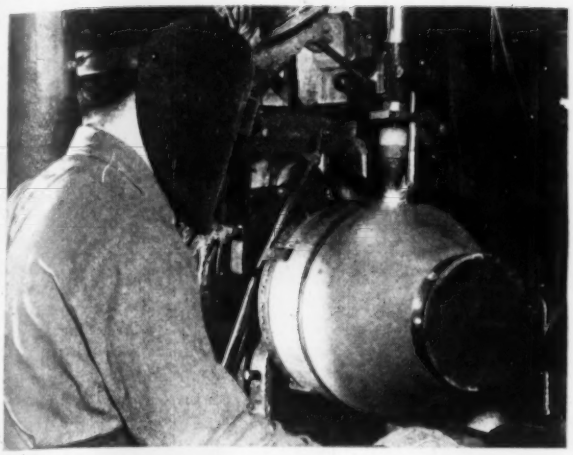
Heliwelding is one of Airco's inert, gas-shielded, arc-welding processes that permits all-position welding of aluminum, magnesium, stainless steel, brass and copper.

Particularly in the lighter sections of these materials, this time-tested, easy-to-use process has proved most economical. Older methods generally require use of fluxes . . . but the envelope of inert gas that shields the weld eliminates the need for flux . . . no slag is formed, thus permitting the operator a clear view of the puddle resulting in welds that are of unexcelled quality with such smooth contours that finishing is reduced to a minimum. This means savings in time, trouble and money.

Furthermore, Heliwelding's special characteristics — the complete gas shielding of a non-consumable electrode — provide a highly efficient and concentrated arc, which, in turn, permits welding at exceptionally high speed.

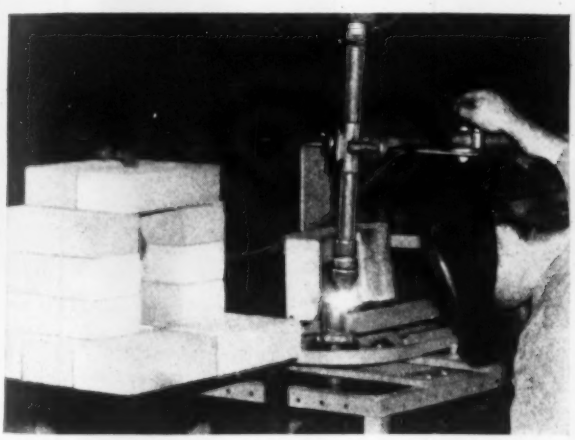
Another outstanding feature of Heliwelding is its minimization of distortion. This is due to its high speed operation with a small diameter electrode. Heat is concentrated to a pin point and moved rapidly along the work . . . thin sections are easily joined and protected by the fact that such a small amount of weld metal is required.

The case studies shown on these pages give you some idea how this exceptional process could help you. While the facts may be startling, they could very easily be applied in your own shop . . . but find out for sure. Write . . . or phone your nearby Airco office. Ask for a copy of ADC-709: "Heliwelding — Catalog 9".

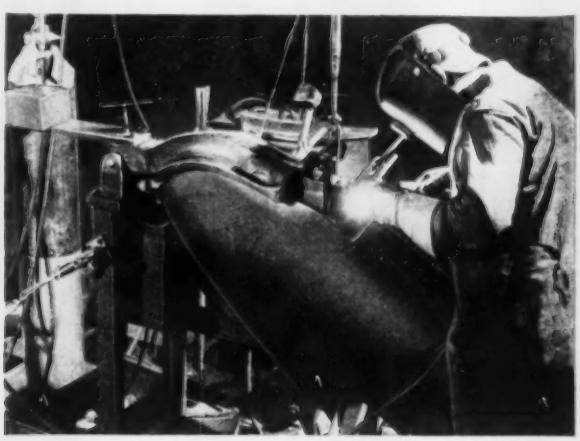


Hinman Milking Machine Company of Oneida, N. Y., found Heliwelding's ability to join stainless steel without a flux ideally suited to the fabrication of pails to be sold in conjunction with their milking machines. Top quality pails were produced quickly and easily; machine finishing was virtually eliminated and polishing reduced to a minimum — tidy savings of money . . . and time.

Ducate Brothers, of Little Ferry, N. J., used Heliwelding to speed production and save cost in the fabrication of copper tanks for hot water heaters. They found this outstanding process extremely fast — and resulting in smooth, high-type welds greatly increasing the quality of the finished product.



Salkover Metal Processing Corp., of Long Island City, N. Y., adapted Heliwelding for mass-producing copper rotors for induction motors. Immediately production jumped to a new high, and costs dropped. Furthermore, Heliwelding permitted complete control of all operating variables — resulting in finer welds, with a minimum of rejects.



A prominent automobile manufacturer found Heliwelding most practical, both from a speed and finishing standpoint. Operating at 13″ per minute, Heliwelding produced a weld metal free from porosity and pinholes — distortion and splitting were completely eliminated on the .042″ sheet metal used to produce fender and similar assemblies.

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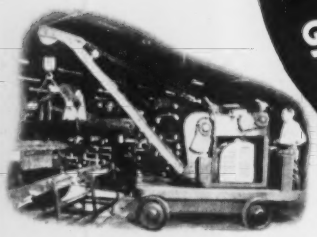

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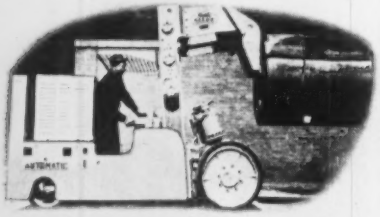
Where electric trucks must be on the go 24 hours a day . . . where full loads must be carried without interruption . . . Ready-Power meets every qualification.

Always dependable, always economical, Ready-Power Units generate *constant* power right on the truck chassis. Models for all sizes, types and makes of electric trucks.

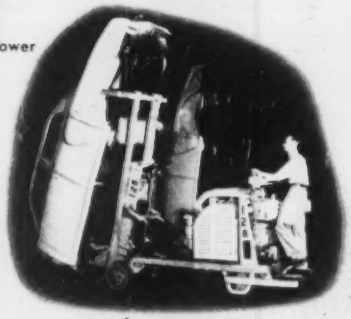


This Automatic Skylift Giant is Ready-Power Equipped

Mercury Platform Powered by Ready-Power

Ready-Power-Equipped Clark Fork-Lift

Yale Worksaver Pallet Truck with Ready-Power



Ready-Power-Equipped Elwell-Parker Truck

The READY-POWER Co.

3824 Grand River Ave., Detroit 8, Michigan

(17,000 psi) the behavior was entirely different. At a slightly higher test stress, (20,000 pounds) there was a noticeable improvement in the life of the specimens. Two thousand cycles and 2 million cycles of prestress produced an increase of more than 400 per cent. Even at 20 million cycles, the increase was of the order of 33 per cent.

The immediate importance of this work is the possibility of improving the fatigue life of structural members by prestressing. Of more fundamental significance, however, is the aid it may offer toward determining the mechanism of fatigue failure in metals.

Cuts Die Repair Time

Parsons Tool Inc., Berlin, Conn., in co-operation with Air Express, recently announced a new nationwide tool and die service for the repair and machining of hardened dies (over 62 Rockwell) without annealing by means of specially designed carbide tools. Milling, drilling, boring and counterboring with carbide tools, without annealing the dies, permits the work to be done much faster and at a very reasonable cost.

A choice of two plans is offered: (1) Customer air expresses the broken die to Parsons Tool. Parsons telephones or telegraphs the customer a firm quotation within 1 hour after its arrival in the plant. If the estimate is satisfactory to the customer, work is begun immediately, and the die is returned Air Express as soon as it is completed. (2) Customer mails a blueprint (air mail special delivery) to Parsons Tool Inc. They telephone or telegraph a firm quotation within 1 hour of receipt of blueprint. If estimate is satisfactory, the customer ships the die Air Express. The job is completed as soon as possible and returned by Air Express.

Meters Get Certification

Watt-hour meters produced by the General Electric Co., Schenectady, N. Y., are now being "factory-certified for highest accuracy and performance," reports Harold E. Strang, manager of the G-E Meter and Instrument Divisions. Written certification of these meters was made possible by "new applications of quality-control evaluation procedures and by unique design and manufacturing techniques never before fully utilized in the mass production of precision measuring devices."

All G-E type I-50 meters now bear seals of certification and are shipped with certificates which indicate they have met highest accuracy and per-

"Impressions that LAST"

FINKL MO-LYB-DIE Processed Die Blocks are made from steel developed by Finkl to answer the needs arising from drop forging problems. Their inherent toughness, resistance to heat checking and washing, high resistance to abrasion, and good machinability are the combinations that give you more forgings per impression and more impressions per die.

The MO-LYB-DIE trademark on a die block is a guarantee that the utmost care and attention have been given to forging, heat treating and testing operations. Learn for yourself—specify Finkl die blocks and get impressions that last.

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Simply set tolerance hands on the lower dial of this Brinell Hardness Tester to the desired limits and the operator merely notes that the indicator points stop within them.

No grinding or preparation of parts is necessary. Foot operation permits free use of both hands. Tests are completed as rapidly as the operator can handle the parts.

Standard Brinell test loads are used . . . machine is motor-driven . . . loads are applied hydraulically . . . round and flat parts are handled equally well.

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formance standards at the factory. Each meter undergoes 18 separate electrical tests and passes 356 inspection points during its manufacturing cycle. During final inspection alone, he explained, each meter must pass 54 separate points of inspection before the gold seal of certification is attached.

Fastener Savings Stories Told

Applications of the Speed Nut fasteners in automobiles, television sets and antennas, household appliances, toys, metal office furniture, stock bins, air conditioning equipment and other appliances are shown in Volume II of "Tinnerman Speed Nut Savings Stories," published by Tinnerman Products Inc., Cleveland.

The 28-page booklet contains a series of case histories showing how the use of Tinnerman fasteners has resulted in tremendous savings in production costs.

As examples, in the production of the Kwik Serv oil changer, by the Allen Electric & Equipment Co., Kalamazoo, Mich., use of Speed Nuts and Speed Clamps resulted in time savings of 80 per cent and a 66 per cent saving in fastening cost. The booklet also shows that General Fireproofing Co. saved 40 per cent in the cost of assembling tops of steel desks. Also for economy and performance 269 different types of fasteners made by the company are being used on the various models of Kaiser-Frazer automobiles.

Plans Conference on Isotopes

Radioisotopes in industry will be the subject of a five-day conference to be held at Case Institute of Technology in Cleveland, Apr. 2-6, in cooperation with the Atomic Energy Commission. The purpose of the conference, first of its type, is to encourage a safe and wider industrial use of radioisotopes.

Basic problems to be considered are: Fundamentals of atomic energy; hazards accompanying atomic energy; safe handling techniques; laboratory construction, control and operation; and practical present-day applications in industry, medicine and research.

Faculty members of Case will be supplemented by eleven visiting lecturers in the presentation of the program. Dr. T. Keith Glennan, member of the Atomic Energy Commission and president of Case on leave of absence, will address the conference Apr. 5.

Exhibits by manufacturers of radiation detection equipment and by the Atomic Energy Commission will be

additional features. The conference fee of $20 includes the ten regular sessions and tickets to a dinner and five luncheons. Copies of the program and registration forms may be obtained by writing to John R. Bradford, radiation-tapes laboratory, Case Institute of Technology, Cleveland 6.

Electronic Equipment Described

"Electronic Equipment Construction—New Objectives, New Techniques and New Components" is the title of a 300-page illustrated report now available from the Office of Technical Services, U. S. Department of Commerce. The study consists of three parts: A description and evaluation of new components; a discussion of new construction techniques; and a survey of research at 62 of the nation's leading electronics development firms and laboratories.

Components covered include fixed and variable resistors, fixed and variable capacitors, high frequency inductors and transformers, multiple-component units, vacuum tubes, crystals and transistors, frequency-control and transducer devices, power and audio transformers, relays, indicating instruments, connectors, tube sockets, batteries, motors and servomechanisms, insulating materials, switches and hermetic seals.

Producing 60 Gears per Hour

More and more, mass production methods are being adapted to job-lot or shorter run production of miscellaneous parts to increase output per machine and man-hour. Typical example is in the manufacture of gears and tractors at Caterpillar Tractor Co., Peoria, Ill. A Shear-Speed gear shaper made by Michigan Tool Co., turns out anywhere from 45 to 60 tractor gears per hour and is used for interchangeable production of eleven different gears at Caterpillar. Eight of these gears are used in one transmission; nine of them—with duplications—in another transmission. Average changeover time is 1 hour when the complete cutter head is removed. When it is necessary only to change the blades in the head, changeover time is cut to only 35 minutes.

Need Aluminum Stampings?

To assist American industry in its selection of subcontractors for defense work capable of supplying volume quantities of small and medium aluminum stampings, the Aluminum Goods Mfg. Co., Manitowoc, Wis., is offering a book, *Present and Future*, which describes the com-

"CIGAR, MARY?"

Just because Joe enjoys a good stogie, he shouldn't assume Mary enjoys one, too!

And just because one bearing is best lubricated by one particular grade of oil, you shouldn't assume that the same oil is best for *all* bearings on that machine. In many cases it isn't.

OIL CUPS permit you to lubricate each bearing with the oil best suited to that bearing—thus prolonging bearing life, reducing maintenance costs, cutting down-time, boosting production. And oil cups fortunately *cost very little*.

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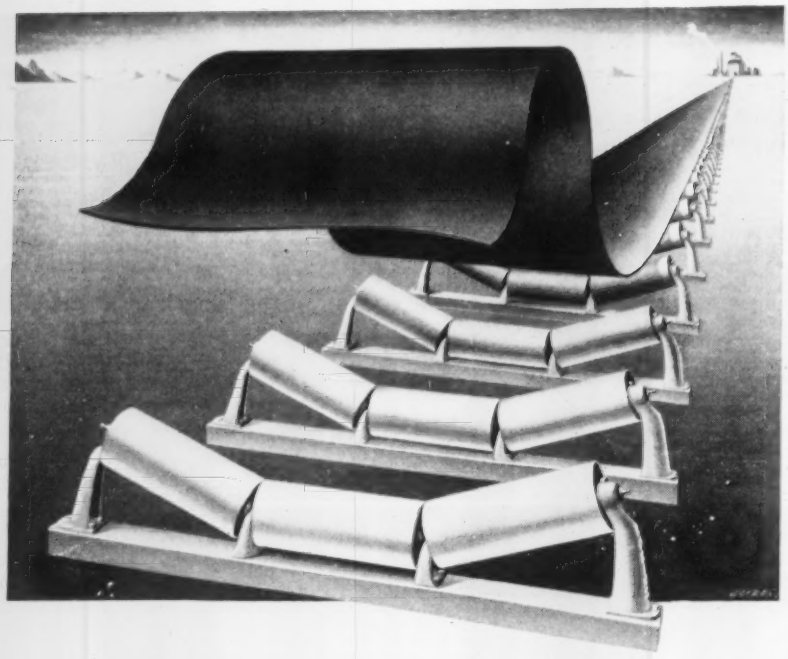

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You are looking at a series of "troughing" idlers . . . the backbone of a Hewitt-Robins Belt Conveyor. Their concave design enables these idlers to cradle the belt they support . . . increasing its carrying capacity, reducing spillage, lengthening belt life.

The trough-shaped idler was invented in 1891 by Thomas Robins, Sr., founder of this company.

This is but one of a notable list of "firsts" to come from Hewitt-Robins. In belting . . . in machinery . . . in hose . . . in ingenious techniques for handling solid and fluid bulk materials . . . Hewitt-Robins always has pioneered.

Today, Hewitt-Robins is unique in another respect. It is the only organization in the world having, within one corporate structure, the complete belt conveyor "package": engineering, specialized machinery *and belting*. Only Hewitt-Robins can assume undivided responsibility for all the elements of a belt conveyor system; *only Hewitt-Robins makes them all.*

Hewitt-Robins can serve you through three industrial divisions—individually or collectively, according to your needs.

Whenever the handling of bulk materials is *your* problem, we invite you to make it ours.

HEWITT HR ROBINS

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HEWITT RUBBER DIVISION: Belting, hose and other industrial rubber products
ROBINS CONVEYORS DIVISION: Conveying, screening, sizing, processing and dewatering machinery
ROBINS ENGINEERS DIVISION: Designing and engineering of materials handling systems

Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation

pany's facilities and experience. Prime defense contractors needing immediate sources for components parts may save valuable time by comparing their needs with the facilities offered by the company. Holders of war contracts which involve component aluminum stampings may write or wire the Aluminum Goods Mfg. Co., Defense Division, for free copies of the book.

Severance Repairs Carbide Tools

Severance Tool Industries Inc., Saginaw, Mich., is releasing a letter to all those interested in carbide tooling in either defense or civilian production, relative to the timeliness of conserving carbide tools through the use of its regrinding and repairing service. The company has been doing this type of work for over 20 years.

Company states dull, broken, discarded carbide tools can be reworked by their specialists so as to give new tool performance. Another suggestion is that many times a new tool, for which there is no current need, can be reworked into a tool to meet a present urgent requirement.

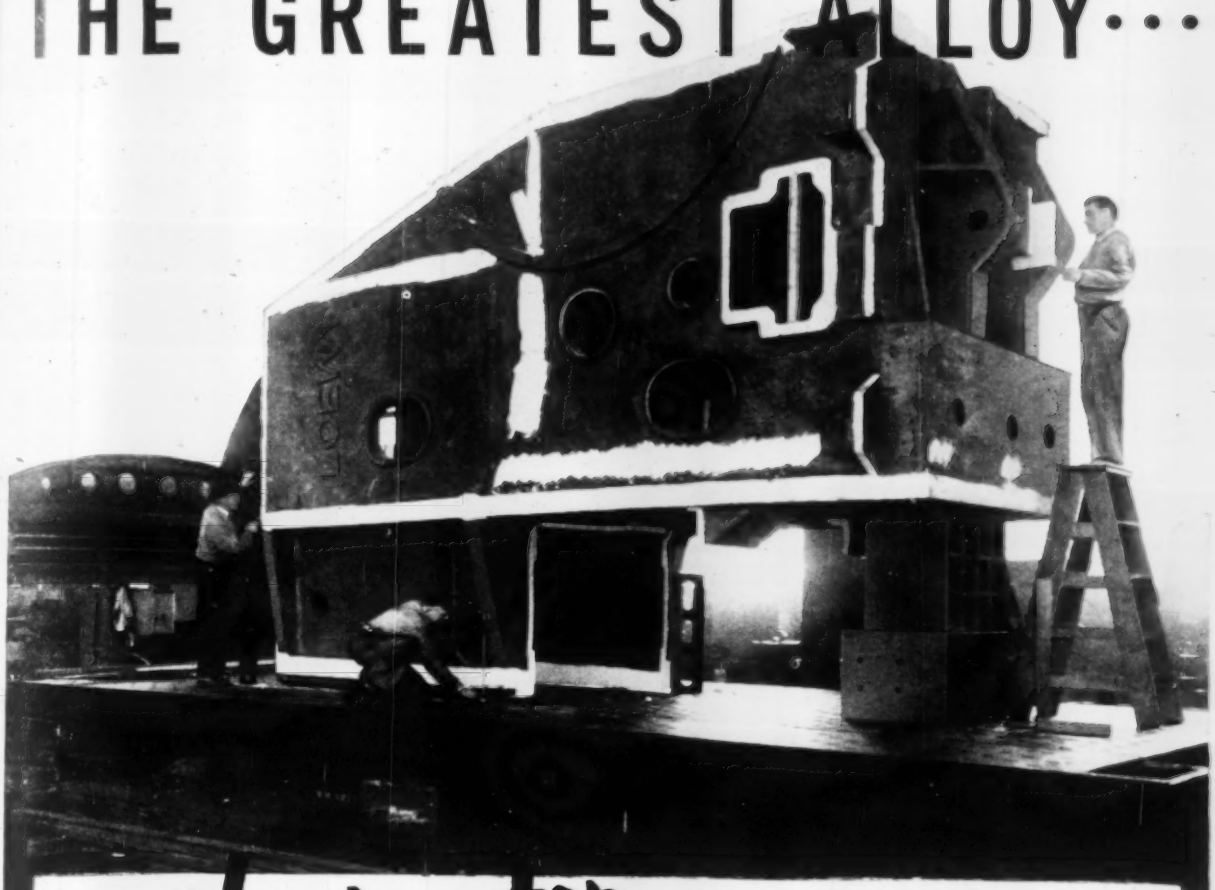
Broken Taps Removed

Twin Thomas Metalmaster metal disintegrator was made to the specifications of one of the large auto companies and was installed on a conveyor line system. Motor blocks containing broken taps are moved on roller lines to each end of the Metalmaster for rapid tap removal. One worker handles both machines without inconvenience or unnecessary hurry. The operation was so successful that several others already have been delivered to other companies and many more are being made, says Jack P. Pedersen, manager of Warner Division, Clinton Machine Co., Detroit, manufacturers of the machines.

Correction: Mass Marquenching

In the article, "Mass Marquenching Speeds Gear Output," STEEL, Feb. 12, p. 72, captions for the photomicrographs, Figs. 2 and 3 were transposed. Fig 2 should have read, "Photomicrograph of a conventionally quenched gear shown for comparison of structure." Fig. 3, "Photomicrograph taken from a tooth of first speed countershaft gear carburized at 1700° F and quenched in 400° F oil. After cooling for 4 hours to room temperature, the gear was washed and tempered at 300° F for 1½ hours."

THE GREATEST ALLOY···



··character

The amazing versatility of steel alloys is a familiar part of the engineer's lore . . . Experienced engineers . . . and the heads of the many and varied industries that use Sun-built products . . . know that other intangible and valuable "alloys" go into the building of machinery and the fabrication of equipment . . . Sun's versatile experience, precise skill, dependability and pride in workmanship give the finished product qualities of service and efficiency as valuable as those that alloys give to the metals used . . . Sun-built products have outstanding engineering *character*.

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CALENDAR
OF MEETINGS

‡ Denotes first listing in this column.

Mar. 19-21, National Association of Waste Material Dealers: Annual meeting, Stevens Hotel, Chicago. Association address: 1109 Times Bldg., New York.

Mar. 19-21, Steel Founders' Society of America: Annual meeting, Edgewater Beach Hotel, Chicago. Society address: 920 Midland Bldg., Cleveland 15.

Mar. 19-23, American Society for Metals: *Seventh* western metal exposition and congress, auditorium and exposition hall, Oakland, Calif. Exposition address: 215 S. Clark Dr., Beverly Hills, Calif.

Mar. 21-22, American Hot Dip Galvanizers Association Inc.: Annual meeting, Hotel Biltmore, Atlanta. Association address: 2311 First National Bank Bldg., Pittsburgh 22.

Mar. 22-23, Pressed Metal Institute: Spring meeting and technical session, Hotel Carter, Cleveland. Institute address: 13210 Shaker Square, Cleveland 20.

Mar. 28-29, Instrument Society of America: Iron and steel instrumentation conference, Carnegie Institute of Technology, co-sponsor, Roosevelt Hotel, Pittsburgh. Society address: 921 Ridge Ave., Pittsburgh.

Apr. 2-3, Diamond Core Drill Mfrs. Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 122 E. 42nd St., New York.

Apr. 2-4, American Institute of Mining and Metallurgical Engineers: Open hearth and blast furnace, coke oven and raw materials conference, Statler Hotel, Cleveland. Institute address: 29 W. 39th St., New York.

Apr. 2-5, Boston and Apr. 9-12, Cleveland, American Chemical Society: Annual meeting. Society address: 1155 16th St., Washington 6.

‡**Apr. 2-5, American Society of Mechanical Engineers:** Spring Meeting, Biltmore Hotel, Atlanta. Society address: 29 W. 39th St., New York 18.

‡**Apr. 2-6, Radioisotopes in Industry, Conference:** Case Institute of Technology, Cleveland. Conference address: Case Institute of Technology, Cleveland 6.

‡**Apr. 4-6, Midwest Power Conference:** Sherman Hotel, Chicago. Conference address: Illinois Institute of Technology, Technology Center, Chicago 6.

Apr. 5, National Metal Trades Association: Annual meeting, New England Congress, Sheraton-Biltmore Hotel, Providence, R. I.

Apr. 8-12, American Hardware Manufacturers Association: Spring convention, Biltmore Hotel, Palm Beach, Fla. Association address: 342 Madison Ave., New York 17.

Apr. 10-11, Westinghouse Machine Tool Electrification Forum: Westinghouse Electric Corp., sponsor, William Penn Hotel, Pittsburgh. Forum address: 306 Fourth Ave., Pittsburgh 30.

Apr. 10-11, Society of Automotive Engineers: Annual earthmoving industry conference, Peoria, Ill. Society address: 29 W. 39th St., New York.

‡**Apr. 16-18, American Society of Lubrication Engineers:** Annual convention and show, Bellevue-Stratford Hotel, Philadelphia. Society address: 343 S. Dearborn St., Chicago 4.

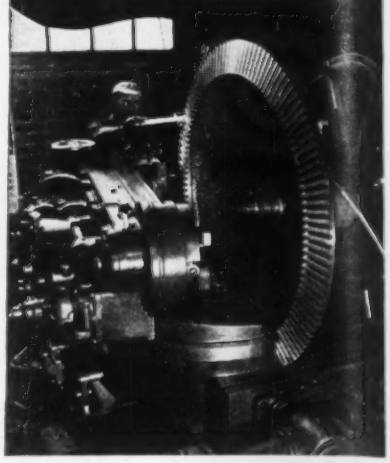
‡**Apr. 18-21, National Screw Machine Products Association:** Annual meeting, Netherland Plaza Hotel, Cincinnati. Association address: 13210 Shaker Square, Cleveland 20.

‡**Apr. 22-26, American Ceramic Society:** Annual meeting, Palmer House, Chicago. Society address: 2525 N. High St., Columbus, O.

‡**Apr. 23-26, American Foundrymen's Society:** Annual national technical convention, Buffalo. Association address: 616 S. Michigan Ave., Chicago 5.

‡**Apr. 30-May 4, Materials Handling Institute:** Fourth National Materials Handling Exposition, International Amphitheatre, Chicago. Institute address: 1108 Clark Bldg., Pittsburgh.

LARGE INDUSTRIAL GEARS



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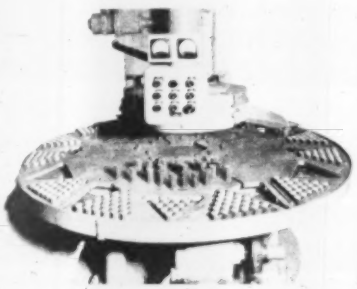
New Products and Equipment

Spring Grinding Economy

Coil springs can be ground quickly and economically with the No. 92-30 60 double vertical spindle disk grinder with semiautomatic cycling made by Charles H. Besly & Co., Beloit, Wis. The machine grinds springs, ½ to 6 inches long, from ¼ to 4 inches in diameter and from 0.0625 to 0.500-inch wire diameter. Abrasives are constructed to grind a variety of spring types as well as materials



such as oil tempered steel, music wire, bronze wire, etc., eliminating time for wheel changeover. Springs pass across the center of 30-inch diameter abrasives with no center holes, eliminating downtime for dressing and abrasive loss resulting from wheel truing operation. Handling time and floor space for work storage between passes are conserved because machine produces finished springs during each cycle.

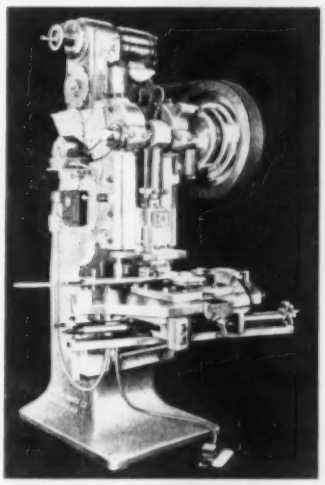
Features incorporated are an electrically controlled hydraulic or fluid motor linked directly to the lead screw of the top head, microswitches which limit the up and down movement of the head and a counterweight to balance the top head. During the grinding cycle operator loads the feedwheel which is rotated at a variable speed from 1/6 to 19 rpm to suit operating conditions. Feedwheel rotation is then increased to grinding speed and the down feed of the top head is started by pushbutton control. When the required size is reached, a limit switch stops the downward travel of the head and a flashing amber light shows the operator that the grinding cycle is in the dwell or spark-out period.

Check No. 1 on Reply Card for more Details

Notches Motor Laminations

V & O Press Co., Hudson, N. Y., has developed a new press for notching motor segment laminations. Presses are used for notching of rotor stator segments of the larger sizes which cannot be handled on the conventional index ring type of fixture. Capacity is from 24-inch diameter segments up to a straight line.

During operation the operator places the segment blank in position on the fixture and steps on a foot switch. The segment automatically moves into notching position against a stop which immediately starts the press and performs the prescribed notching operation. At end of cycle microswitch action stops the press and returns the notched segment to



its original position for removal. No index ring is required as the spacing is provided in the die.

Check No. 2 on Reply Card for more Details

Precise Straightening

Effective roll work area is increased with the double tilt roll levelers made by Maust Machinery Corp., 85-36 212th St., Queens Village 8, L. I., N. Y. Reason is that all rolls of the center group knead material intensively at uniform, maximum wave depth. Upper roll bank is subdivided into three groups: Entry roll group subjects material to gradually increasing waves, center group thoroughly works it at constant maximum wave, and exit group flattens material out.

Leveler may be instantly reversed without any readjustment. Work material is sucked into rolls without effort of the operator, entry marks are practically eliminated and no subsequent shearing of flat sheet is required. Only central roll group takes heavy work load, at this point universal joints and drive spindles have least angularity and maximum torque capacity. Levelers with 17 or more straightening rolls may be supplied with the company's patented double tilt roll arrangement.

Check No. 3 on Reply Card for more Details

Compact Pump

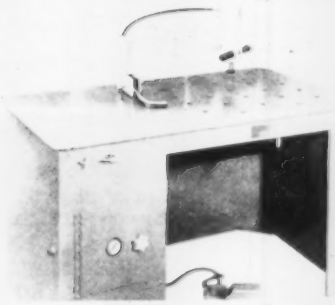
An addition to its line of pumps is announced by Eco Engineering Co., 12 New York Ave., Newark, N. J. The M-3 is the most compact unit the company has designed to date with an overall length of only 3 9/16 inches. It is designed for flange mounting and pumps 1.65 gpm at 1750 rpm, operating against pressures up to 150 psi at the higher speeds. It is available with or without flang-mounted motor.

Unit pumps in either direction and bearings require no lubrication. Pumps are available in naval bronze forgings for long life and resistance to corrosion.

Check No. 4 on Reply Card for more Details

Wrinkle Removers

Shrink finishing machine made by Hufford Machine Works Inc., 207 N. Broadway, Redondo Beach, Calif., removes wrinkles from parts formed on rubber pad presses. The machine employs a mechanically driven lead slapper which eliminates all manual effort. A foot pedal releases air to



a pneumatic clamp which secures the part and its respective form block to the steel table top during the process. By depressing the foot pedal further, the lead slapper is actuated parallel to the table and strikes a series of blows along the wrinkled edge of the workpiece. After the first few blows, the slapper conforms over its entire length to the shape of the work. Metal flow is restricted to the area encompassed by the slapper and metal is compressed to occupy less surface area causing wrinkles to disappear. Frequency of the blow can be altered

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to suit the particular condition.

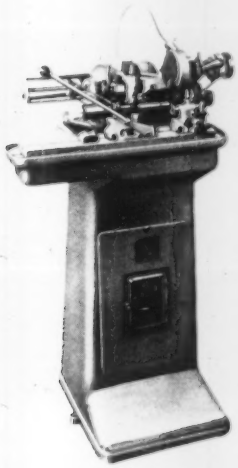
After the shrinking operation, work and form block are taken to the Hufford planishing machine which incorporates an air driven hammer assembly mounted on a smooth table top.

The hammer is activated by pressure of the work against the head itself. The shape of the removable work head can be chosen to suit the job.

Check No. 5 on Reply Card for more Details

Volume Burnishing

A high precision Swiss tool for burnishing developed by Henri Hauser Ltd., is available from Hauser Machine Tool Corp., 30 Park Ave., Manhasset, N. Y. Range of the Hauser type 241 is: Minimum diameter to be polished, 0.008-inch; maximum diameter to be polished, 0.197-inch;



maximum length to be polished, 0.315-inch; and maximum length of workpiece, 5 inches.

Burnishing is done by special carbide or ceramic wheels having long life but requiring little redressing. It will polish pivots straight, taper or radius, and will polish shoulder at the same time as the cylinder at right angle or bevel. Work can be done on mild steel, hardened steel, stainless, brass, nickel, bronze, etc. Capacity is 600 or more pivots per hour. Work is done in collets or on centers.

Check No. 6 on Reply Card for more Details

Wet Abrasive Cutting

A rotary-oscillating-hydraulic type wet abrasive cutting machine, model 508, is announced by Campbell Machine Division, American Chain & Cable Co. Inc., Bridgeport, Conn. Machine will cut round bars up to 8-inches diameter and tubing up to 8

60 million

just isn't enough

Sixty million is a lot of anything and that is the number of items Townsend can produce in one working day. Lately it just isn't enough to go around. We have strained every facility and every source of raw material to keep our production above average—but we still can't keep ahead of our orders.

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We believe our backlog of orders is in some measure caused by the savings we have created for our customers—so we intend to keep quality up to our rigid standards, no matter how busy we get.

Even if you must wait for delivery—you can count on Townsend quality control which has back of it 135 years of experience in wire drawing and cold-heading.

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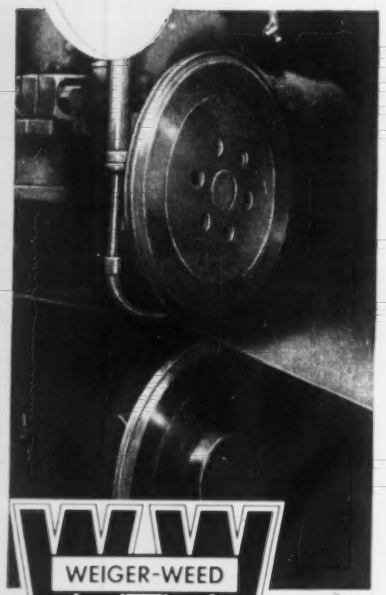
1 month out of 12 on re-dressing!



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SEAM WELDING WHEELS

Actual year's closely kept record: In one of the largest tube mills: WW Seam Welding Wheels required dressing only once in every three weeks.

Wheels formerly used, had to be re-dressed every week, taking 6 man-hours. Total for year, 312 man-hours.

In the same period Weiger-Weed wheels required only 104 man-hours for re-dressing. A saving of 208 man-hours, or a full month!

This does not mean that the previous wheels were inferior in quality. Wheels of this type alloy are satisfactory on many tube mill applications. WW application engineers saw that this particular installation was different and recommended the correct WW alloy. This same service is available to you. Weiger Weed & Company, Division of Fansteel Metallurgical Corporation, 11644 Cloverdale Avenue, Detroit, Michigan.

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Resistance Welding ELECTRODES
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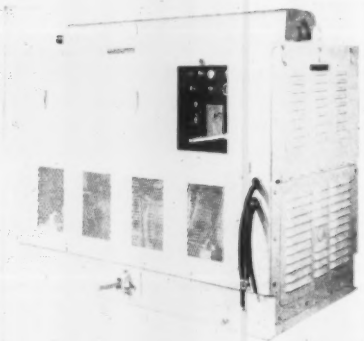
inches OD either ferrous, nonferrous or plastic materials, including corrosion resisting as well as well as hardened or annealed steel.

Temperature of work is controlled by proper distribution of coolant. Cutting is done with a minimum of burr. It is a revolving work bar type machine with oscillating abrasive cutting wheel, hydraulic wheel feed and hydraulic clamps.

Check No. 7 on Reply Card for more Details

Truck Power Units

Diesel-electric power units for electric industrial truck operation have been developed by Ready-Power Co., 11237 Freud Ave., Detroit 14, Mich. Four models to power trucks of 6000-pound capacity and larger employ the



same principle as the widely-used gasoline models. An engine-driven generator producing continuous electric power is mounted right on the truck chassis.

Model RD-14-DX for electric trucks of 30,000 to 50,000 pound capacity is illustrated.

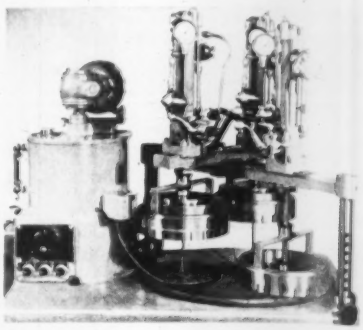
Check No. 8 on Reply Card for more Details

Lapping Range Widened

Two standard attachments for the Lapmaster made by Crane Packing Co., 1800 Cuyler Ave., Chicago 13, Ill., enables users to speed production and simplify handling of certain types of parts. These attachments are the roller bar and pneumatic lifts.

Roller bar attachment is designed to facilitate loading and unloading of tall or large parts. It makes use of brackets mounted outside the circumference of the lap plate. Elongated slots allow adjustment of these conditioning ring holding brackets. Height of parts is unlimited and in most cases, large heavy castings lap of their own weight. When large numbers of small parts must be lapped the pneumatic lift attachment speeds production by facilitating loading and removal of parts and workholders.

Each conditioning ring and pressure plate unit is individually raised by a pneumatic lift. When automatic lapping cycle stops each lift is quickly



raised by pneumatic pressure, lapped parts removed and preloaded workholders placed in position with a minimum of time.

Check No. 9 on Reply Card for more Details

Simplified Impact Wrench

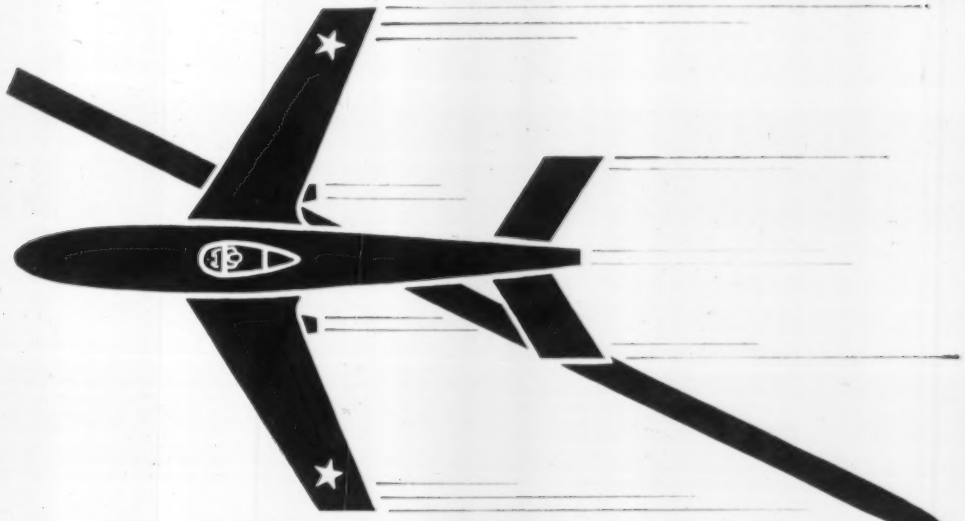
An impact wrench that can be used for both driving and removing nuts, studs, screws, etc., in all types of assembly and subassembly is announced by Master Pneumatic Tool Co. Inc., Orwell, O. Model M950 impact wrench is rated for ⅜-inch bolt size capacity on most work but by the use of a new type air inlet control valve this one size of tool may be used for many different sizes of work. There are only two impacting parts and the unit does not contain any springs or gears. Impacting takes place only when the nut begins to tighten. Reverse valve is readily accessible to the operator's thumb.

It weighs about 5¼ pounds. Wrench operates on air pressure from 80 to 100 psi and consumes 16 to 17 cfm under load. Featured is a steel clutch housing to lengthen housing life. Handle and motor housing unit is a one-piece magnesium casting containing an oil reservoir with an automatic oiling device.

Check No. 10 on Reply Card for more Details

• • •

CRADLE-MOUNTED VIBRATORS: Series No. 82 cradle-mounted pneumatic vibrators, made by Spo Inc., Cleveland 25, O., deliver powerful hammer-like impacts in a direction either parallel or 90 degrees to material flow. Units are recommended for permanent installation on conveyors, hoppers, screens, tables and other types of materials handling equipment. Vibrators have corrosion-proof bronze alloy cylinder liners which assure proper lubrication and full power starting, high speed opera-



TUF-STUF'S best proving ground is in the air!

It pays to specify TUF-STUF aluminum bronze alloys for parts that must stand up

● Because they are both light and tough, TUF-STUF aluminum bronze alloys have proven invaluable in America's aircraft as valve-seat inserts, spark plug inserts, valve guides, gears and other vital parts.

If your product requires machined parts that are strong but light, resistant to corrosion, long wearing and resistant to oxidation even at high temperatures, then TUF-STUF is the right alloy for the job.

TUF-STUF alloys are furnished in the form of forgings, rods and screw machine parts. They fill Federal Specification QQ-B-666, Grade B, and several other variations. Because of the increased use and demand for both aluminum and copper, jobs carrying a Defense Order Number are receiving first consideration.

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

61

tion and maximum service life. They are available in 1½-inch piston diameter size.

Check No. 11 on Reply Card for more Details

RECORDS TEST DATA: Speedomax electronic recorder, introduced by Leeds & Northrup Co., Philadelphia 44, Pa., features a range continuously adjustable over a 20:1 ratio and zero suppression adjustable over more than twice the maximum range. Typical measurements include: Measurements with strain gages, temperature difference measurements with thermocouples and speed measurements.

Check No. 12 on Reply Card for more Details

METALLIC TUBING: Central electric metallic tubing, made by National Supply Co.'s Spang-Chalfant Division, Etna, Pa., receives complete exterior and interior surface finishing for extra protection. It is a lightweight steel conduit and is adaptable to a wide variety of electrical raceway services.

Check No. 13 on Reply Card for more Details

HOLDS PARTS: De-Sta-Co No. 424, a new portable plier type toggle clamp is announced by Detroit Stamping Co., Detroit 3, Mich. It is suitable for holding metal, wood or plastic parts during machining, welding and cementing operations. It provides positive holding pressure with a firm toggle locking action.

Check No. 14 on Reply Card for more Details

BUNDLES SECURELY: A bundling chain with an automatic lock which permits bundles to be stored indefinitely and held securely is available from American Chain Division, American Chain & Cable Co. Inc., York, Pa. The drop forged lock may be obtained as a separate unit or as part of a chain assembly. It is made for 17/32, 9/16, 5/8 and 21/32-inch chain.

Check No. 15 on Reply Card for more Details

PROTECTION FOR METALS: A new ceramic coating for metals and alloys that withstands oxidation, corrosion, flexing, vibration, percussion and severe thermal shocks is available from Elraco Engineering Co., Hoboken, N. J. Known as Elkote, it provides a protective barrier against corrosion and oxidation at temperatures up to 2400° F.

Check No. 16 on Reply Card for more Details

POWERED HAND TOOL: Designed for constant duty without slowdown, a new hand grinder available from Chicago Wheel & Mfg. Co., Chicago 7, Ill., has power, speed and stamina to do everything from delicate die jobs to hogging off substantial amounts of stock. Designated as Hi-Power grinder, it is equipped with eight accessories and comes in two models. The motor is independently mounted and detachable from its handpiece.

Check No. 17 on Reply Card for more Details

LIMIT SWITCHES: Designated as ES4-NM series, limit switches for use with momentarily-pulsed, solenoid-operated valves for air and hydraulic cylinder circuits, are announced by Electro-Snap Division, Exhibit Supply Co., Chicago, Ill. They are furnished in 1/16, 1/8 and 3/16-inch standard lengths and can be furnished with "on" time lengths up to 3/8-inch on special order.

Check No. 18 on Reply Card for more Details

FOR FACE PROTECTION: A new line of faceshields is announced by Mine Safety Appliances Co., Pittsburgh 8, Pa. Chempruf visor is built to guard face, eyes and neck against chemical splash and Chipruf visor offers protection against light flying particles. Both visors are interchangeable on the company's standard Headline design headgear.

Check No. 19 on Reply Card for more Details

PROTECTS SURFACES: Sicon, an improved silicone base finish, developed by Midland Industrial Finishes Co., Waukegan, Ill., is for use on metal products requiring a highly heat resistant protective coating. It is claimed to have stability at temperatures as high as 1000° F. It can be applied by brush, spray or dip and air dries or adapts itself to any force dying system.

Check No. 20 on Reply Card for more Details

FOR EXACT SETTING: For use where exact setting of regulated flow of water or other liquids is required, a deluxe stop cock is offered by Reynolds Shaffer Co., Detroit 4, Mich. It can be used as a flow-regulating valve for jet pumps, spray pumps; as a by-pass valve on boiler feed lines. The positive O-ring packing will withstand almost any pressure and will not leak.

Check No. 21 on Reply Card for more Details

BIN VALVE: Twistite double closure bin valve, made by Stephens-Adamson Mfg. Co., Aurora, Ill., consists of two rubber sleeves joined by a rotating steel collar. Dust and driptight closure is obtained by pulling on a cable wrapped around the rotating collar, sealing the opening with a twist in each rubber sleeve. Valve is self-opening and can be hand controlled locally by mounting a ratchet lock on the valve to hold cable in closed position. Valve will handle lump sizes up to 2½ inches.

Check No. 22 on Reply Card for more Details

FOR CLEAN LIQUID: Stayner hydraulic filter, introduced by Dollinger Corp., Rochester 3, N. Y., is designed for use wherever dirty liquids are collected and recirculated. Unnecessary wear on pumps and equipment is prevented by eliminating intake of abrasive particles and spoilage and rejects at point of use are kept to a minimum by insuring clean, clear liquid. Filtering medium is 100 mesh stainless steel wire, Monel, bronze, Inconel, brass, galvanized steel and aluminum; ten different types of fabric medium are also available.

Check No. 23 on Reply Card for more Details

FOOT SWITCH: Linemaster Treadlite footswitch, developed by Simonds Machine Co. Inc., Southbridge, Mass., is offered in two models. Model T-51-S, which may be wired normally open or normally closed, is a single pole, double throw momentary contact switch rated at 5 amp, 110 or 250 v. Model T-52-S is identical in outside appearance and size, but provides two switching operations activated by one treadle. Units are small and compact.

Check No. 24 on Reply Card for more Details

MINIATURE SPEED DRIVE: Type 4B miniature variable speed drive with lever type speed control is available from Metron Instrument Co., Denver 9, Colo. The small, compact, sealed unit has ratings up to 2 pound-inches of torque, 0.025-hp, 20,000 rpm and ratio is infinitely variable from 1/6 to 6. It is advantageous in applications requiring remote or automatic control. The actuating lever carries a pointer which indicates ratio setting on top of unit. However, remote ratio indication can easily be obtained by a scale associated with remote actuating speed adjuster.

Check No. 25 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

The Market Outlook

STEEL distribution is becoming increasingly involved in a tangle of government regulations. Priorities are piling up on priorities. And the trade is rapidly attaining the stage of high confusion which characterized conversion to all-out armament and related production in the early days of World War II. Increasingly, hopes are pinned on adoption of a Controlled Materials Plan as the only means for averting serious disorder in mill scheduling and shipping. Control authorities are driving to set up a CMP organization but it appears unlikely the plan can be made operative before July.

CONFUSION—Mounting priorities, many needing clarification in relation to others, last week threw steelmakers into a dither as the deadline approached for setting up May rolling schedules. Now that the deadline, Mar. 15, has been passed they are more perplexed than ever. They don't know where they stand as to available supplies. Neither do their customers, especially those seeking unrated tonnage.

ALLOCATIONS—One major cause for confusion is the placing of most, if not all, allocation programs on a DO-rated basis. Set up under approval of the National Production Authority, these programs hitherto took precedence in mill scheduling second to DO-rated orders and an ever-increasing number of special directives. DO-ratings are on a first-come-first-served basis and are far extended in some cases. Consequently, producers are in a quandary as to whether they can live up to their original obligations on the directive programs for May under such ratings notwithstanding an increase in DO-rated minimum mill tonnage set-asides. Some mills are reported seeking legal advice as to how to proceed.

TROUBLE—Adding to the confusion, the mills last week received orders carrying the same identical DO-rated number for more than one program. For instance, DO-orders came in against tonnage for the locomotive, barge, maritime, and carbuilding programs carrying the single number 38. On the other hand, orders were received also against the container program carrying the DO number 45. At the same time, it is understood DO ratings are being set up on a broad scale for power plant construction and power equipment requirements. Some steelmakers are disposed to regard the DO-ratings imposed on programmed tonnage as something that can be added to the newly increased minimum mill quotas for DO account which have been upped sharply on some products, including a boost to 25 per cent from 17 on hot-rolled sheets.

PRODUCTION—Output of steel in February was the largest for that month on record despite difficulties attending the switchmen's strike. Total for the month was 7,762,000 net tons. This was nearly 1 million tons more than in the like month last year. In the first two months this year more than 16.6 million tons poured from the nation's furnaces, 12 per cent above a year ago. Latest figures on shipments, for January, show movement of 6,904,688 tons from the mills that month, largest ever reported. The total exceeded the December movement by nearly 500,000 tons and topped the previous record, in October 1950, by 400,000 tons.

OPERATIONS—The mills produced slightly less than 2 million tons last week, railroad labor trouble in the Pittsburgh works of Jones & Laughlin Steel Corp. causing a 1.5 point drop in the national ingot rate to 99.5 per cent of capacity.

PRICES—Steel and related markets are firmly established at the January levels, frozen under government economic stabilization regulations. STEEL's weighted index on finished steel holds at 171.92 as does the arithmetical composite at $106.32, pig iron at $52.54 for No. 2 foundry, $52.16 for basic and $53.27 for malleable. Steelmaking scrap composite is steady at $44 under the government freeze, but considerable upgrading is reported in the market with a serious supply shortage threatening.

NATIONAL STEELWORKS OPERATIONS

DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Mar. 17	Change	Same Week 1950	Same Week 1949
Pittsburgh	88.5	12.5	93	100
Chicago	106	0.5*	89	101.5
Mid-Atlantic	100.5	1	83	98
Youngstown	106	0	80	105
Wheeling	96.5	0.5	100	96.5
Cleveland	101	2	95	105.5
Buffalo	104	0	104	104
Birmingham	100	22	87	100
New England	90	0	80	87
Cincinnati	101	2	96	103
St. Louis	97	2	84.5	89.5
Detroit	107	1	104	106
Western	100	3.5	86	99
Estimated national rate	99.5	1.5	90	101.5

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

Composite Market Averages

	Mar. 15 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	171.92	171.92	171.92	156.13	111.62
Index in cents per lb.	4.657	4.657	4.657	4.230	3.024
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$93.18	$63.54
No. 2 Fdry, Pig Iron, GT	52.54	52.54	52.54	46.47	25.42
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	24.75
Malleable Pig Iron, GT	53.27	53.27	53.27	47.27	26.04
Steelmaking Scrap, GT	44.00	44.00	44.00	27.50	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39. Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Mar. 15 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bar, H.R., del. Philadelphia	4.18	4.18	4.18	3.93	2.82
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10–15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.90	3.90	3.90	3.46	2.465
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.60	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh	3.60–75	3.60–75	3.60–75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75–4.00	3.75–4.00	3.75–4.00	3.25	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65–5.35	4.65–5.35	4.65–5.35	4.15	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.35–5.60	4.35–5.60	4.35–5.60	4.35–40	3.15
Wire, Basic, Pittsburgh	4.85–5.10	4.85–5.10	4.85–5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90–6.20	5.90–6.20	5.90–6.20	5.30	3.25
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, ⅜-⅝", Pitts.	4.10–30	4.10–30	4.10–30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.06	$26.25
Basic, Valley	52.00	52.00	52.00	46.00	25.25
Basic, del. Phila.	56.39	56.39	56.38	49.44	27.09
No. 2 Fdry, Pitts.	52.50	52.50	52.50	46.50	25.75
No. 2 Fdry, Chicago	52.50	52.50	52.50	46.50	25.75
No. 2 Fdry, Valley	52.50	52.50	52.50	46.50	25.75
No. 2 Fdry, Del. Phila.	56.89	56.89	56.89	49.94	27.69
No. 2 Fdry, Birm.	48.88	48.88	48.88	42.38	22.13
No. 2 Fdry (Birm.) del. Cin.	55.58	55.58	55.58	49.08	25.81
Malleable Valley	52.50	52.50	52.50	46.50	25.75
Malleable, Chicago	52.50	52.50	52.50	46.50	25.75
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.00	$45.00	$45.00	$31.00	$20.00
No. 1 Heavy Melt, E. Pa.	43.50	43.50	43.50	23.50	18.75
No. 1 Heavy Melt, Chicago	43.50	43.50	43.50	27.50	18.75
No. 1 Heavy Melt, Valley	45.00	45.00	45.00	31.75	20.00
No. 1 Heavy Melt, Cleve.	44.00	44.00	44.00	28.25	19.50
No. 1 Heavy Melt, Buffalo	44.00	44.00	44.00	28.25	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	40.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	41.00	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$13.25	$7.50
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	15.50	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	21.00	13.00

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	18.50	12.00
Zinc, E. St. Louis	17.50	17.50	17.50	9.75	8.25
Lead, St. Louis	16.80	16.80	16.80	11.80	6.35
Tin, New York	134.00	182.00	182.50	74.125	52.00
Aluminum, del.	19.00	19.00	19.00	17.00	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid	50.50	50.50	50.50	40.00	35.00

Pig Iron

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax on producing companies published on following two pages.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	58.79	59.29	....
Newark, del.	56.63	57.13	57.63	58.13
Philadelphia, del.	56.39	56.89	57.39	57.89
Birmingham District				
Alabama City, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S8	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.58	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	61.26	61.76	62.20	....
Rochester, N.Y., del.	54.63	55.13	55.63	....
Syracuse, N.Y., del.	55.58	56.08	56.58	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	53.89	54.39	54.39	54.89
Muskegon, Mich., del.	....	57.98	57.98	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, del. from Cleve.	54.39	54.89	54.89	54.39
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	53.25	53.75	....
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.20	....	....
Portland, Oreg., del.	....	60.20	....	....
Los Angeles, San Francisco, del.	59.70	60.20	....	....
Granite City, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.65	55.15	55.65	....
Ironton, Utah C11	52.00	52.50	....	....
LoneStar, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.69	53.69	54.19
McKees Rocks, del.	....	53.45	53.45	53.96
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	53.94	53.94	54.44
Verona, del.	....	54.40	54.40	54.90
Brackenridge, del.	....	54.63	54.63	55.13
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.01	57.51	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.26	56.76	56.76	57.26

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$89.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	96.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.50
Steelton, Pa. B2	60.00
Philadelphia delivered	62.00
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

All prices quoted under GCPR as reported to STEEL, Mar. 15, 1951; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana, Calif. K1 ...$79.00
Munhall, Pa. U5 ...52.00

INGOTS, Alloy (NT)
Detroit, Mich. ...$54.00
Fontana, Calif. K1 ...80.00
Houston, Tex. S5 ...62.00
Midland, Pa. C18 ...54.00
Munhall, Pa. U5 ...54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer, Pa. U5 ...$56.00
Clairton, Pa. U5 ...56.00
Ensley, Ala. T2 ...56.00
Fairfield, Ala. T2 ...56.00
Fontana, Calif. K1 ...75.00
Gary, Ind. U5 ...56.00
Johnstown, Pa. B2 ...56.00
Lackawanna, N.Y. B2 ...56.00
Munhall, Pa. U5 ...56.00
So. Chicago, Ill. U5 ...56.00
So. Duquesne, Pa. U5 ...56.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ...$66.00
Buffalo, N.Y. R2 ...66.00
Canton, O. R2 ...66.00
Clairton, Pa. U5 ...66.00
Cleveland, O. R2 ...66.00
Conshohocken, Pa. A3 ...73.00
Detroit, Mich. R7 ...69.00
Ensley, Ala. T2 ...66.00
Fairfield, Ala. T2 ...66.00
Fontana, Calif. K1 ...85.00
Gary, Ind. U5 ...66.00
Geneva, Utah G1 ...66.00
Houston, Tex. S5 ...74.00
Johnstown, Pa. B2 ...66.00
Lackawanna, N.Y. B2 ...66.00
Los Angeles, Calif. B3 ...85.00
Munhall, Pa. U5 ...66.00
Seattle, Wash. B3 ...85.00
So. Chicago, Ill. R2, U5, W14 ...66.00
So. Duquesne, Pa. U5 ...66.00
So. San Francisco, Calif. B3 ...85.00

Alloy, Forging (NT)
Bethlehem, Pa. B2 ...$70.00
Buffalo, N.Y. R2 ...70.00
Canton, O. R2 ...70.00
Canton, O. (29) T7 ...66.00
Conshohocken, Pa. A3 ...7.00
Detroit, Mich. R7 ...73.00
Fontana, Calif. K1 ...89.00
Gary, Ind. U5 ...70.00
Houston, Tex. S5 ...78.00
Ind. Harbor, Ind. Y1 ...70.00
Johnstown, Pa. B2 ...70.00
Lackawanna, N.Y. B2 ...70.00
Los Angeles, Calif. B3 ...90.00
Massillon, O. R2 ...70.00
Midland, Pa. C18 ...70.00
Munhall, Pa. U5 ...70.00
So. Chicago R2, U5, W14 ...70.00
So. Duquesne, Pa. U5 ...70.00
Struthers, O. Y1 ...70.00
Warren, O. C17 ...70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton, O. R2 ...$82.00
Cleveland, O. R2 ...82.00
Fontana, Calif. K1 ...103.00
Gary, Ind. U5 ...82.00
Massillon, O. R2 ...82.00
So. Chicago, Ill. R2 ...82.00
So. Duquesne, Pa. U5 ...82.00

SHEET BARS (NT)
Fontana, Calif. K1 ...$89.00

SKELP
Aliquippa, Pa. J5 ...3.45
Munhall, Pa. U5 ...3.35
Warren, O. R2 ...3.35
Youngstown R2, U5 ...3.35

WIRE RODS
Alabama City, Ala. R2 ...4.10
Buffalo, N.Y. W12 ...4.10
Cleveland, O. A7 ...4.10
Donora, Pa. A7 ...4.10
Fairfield, Ala. T2 ...4.10
Fontana, Calif. K1 ...4.90
Houston, Tex. S5 ...4.50
Johnstown, Pa. B2 ...4.10
Joliet, Ill. A7 ...4.10
Los Angeles, Calif. B3 ...4.90
Minnequa, Colo. C10 ...4.35
Monessen, Pa. P7 ...4.30
No. Tonawanda, N.Y. B11 ...4.10
Pittsburg, Calif. C11 ...4.75
Portsmouth, O. P12 ...4.30
Roebling, N.J. R5 ...4.20
So. Chicago, Ill. R2 ...4.10
Sparrows Point, Md. B2 ...4.20
Sterling, Ill. (1) N15 ...4.10
Struthers, O. Y1 ...4.10
Torrance, Calif. C11 ...4.90
Worcester, Mass. A7 ...4.40

PLATES, Wrought Iron
Economy, Pa. B14 ...8.80

STRUCTURALS
Carbon Steel Stand. Shapes
Alabama City, Ala. R2 ...3.60
Aliquippa, Pa. J5 ...3.65
Bessemer, Ala. T2 ...3.65
Bethlehem, Pa. B2 ...3.70
Clairton, Pa. U5 ...3.65
Fairfield, Ala. T2 ...3.65
Fontana, Calif. K1 ...4.25
Gary, Ind. U5 ...3.65
Geneva, Utah G1 ...3.65
Houston, Tex. S5 ...4.05
Ind. Harbor, Ind. I-2 ...3.65
Johnstown, Pa. B2 ...3.70
Kansas City, Mo. S5 ...4.25
Lackawanna, N.Y. B2 ...3.70
Los Angeles, Calif. B3 ...4.25
Minnequa, Colo. C10 ...4.10
Munhall, Pa. U5 ...3.65
Niles, Calif. (22) P1 ...4.85
Phoenixville, Pa. P4 ...4.95
Portland, Oreg. O4 ...4.50
Seattle, Wash. B3 ...4.30
So. Chicago, Ill. U5, W14 ...3.65
So. San Francisco, Calif. B3 ...4.20
Torrance, Calif. C11 ...4.25
Weirton, W.Va. W6 ...3.90

Alloy Stand. Shapes
Clairton, Pa. U5 ...4.35
Fontana, Calif. K1 ...5.55
Munhall, Pa. U5 ...4.35
So. Chicago, Ill. U5 ...4.35

H.S., L.A. Stand. Shapes
Aliquippa, Pa. J5 ...5.50
Bessemer, Ala. T2 ...5.50
Bethlehem, Pa. (14) B2 ...5.50
Clairton, Pa. U5 ...5.50
Fairfield, Ala. T2 ...5.50
Fontana, Calif. K1 ...6.10
Gary, Ind. U5 ...5.50
Geneva, Utah G1 ...5.50
Ind. Harbor, Ind. I-2 ...5.50
Ind. Harbor, Ind. Y1 ...6.00
Johnstown, Pa. B2 ...5.50
Lackawanna, N.Y. (14) B2 ...5.50
Los Angeles, Calif. B3 ...6.05
Munhall, Pa. U5 ...5.50
Seattle, Wash. B3 ...6.10
So. Chicago, Ill. U5 ...5.50
So. San Francisco, Calif. B3 ...6.00
Struthers, O. Y1 ...6.00

Wide Flange
Bethlehem, Pa. B2 ...3.70
Clairton, Pa. U5 ...3.65
Fontana, Calif. K1 ...4.65
Lackawanna, N.Y. B2 ...3.70
Munhall, Pa. U5 ...3.65
So. Chicago, Ill. U5 ...3.65

H.S., L.A. Wide Flange
Bethlehem, Pa. B2 ...5.50
Lackawanna, N.Y. B2 ...5.50
Munhall, Pa. U5 ...5.45
So. Chicago, Ill. U5 ...5.45

SHEET STEEL PILING
Ind. Harbor, Ind. I-2 ...4.45
Lackawanna, N.Y. B2 ...4.45
Munhall, Pa. U5 ...4.45
So. Chicago, Ill. U5 ...4.45

BEARING PILES
Munhall, Pa. U5 ...3.65
So. Chicago, Ill. U5 ...3.65

PLATES, High-Strength Low-Alloy
Aliquippa, Pa. J5 ...5.65
Bessemer, Ala. T2 ...5.65
Clairton, Pa. U5 ...5.65
Cleveland J5, R2 ...5.65
Conshohocken, Pa. A3 ...5.90
Fairfield, Ala. T2 ...5.65
Fontana, Calif. (30) K1 ...6.25
Gary, Ind. U5 ...5.65
Geneva, Utah G1 ...5.65
Ind. Harbor, Ind. I-2 ...5.65
Ind. Harbor, Ind. Y1 ...6.15
Johnstown, Pa. B2 ...5.65
Munhall, Pa. U5 ...5.65
Pittsburgh J5 ...5.65
Seattle B3 ...6.55
Sharon, Pa. S3 ...5.70
So. Chicago, Ill. U5 ...5.65
Sparrows Point, Md. B2 ...5.65
Warren, O. R2 ...5.65
Youngstown Y1 ...6.15

PLATES, Open-Hearth Alloy
Claymont, Del. C22 ...4.85
Coatesville, Pa. L7 ...5.25
Conshohocken, Pa. A3 ...5.05
Fontana, Calif. K1 ...5.70
Gary, Ind. U5 ...4.75
Johnstown, Pa. B2 ...4.75
Munhall, Pa. U5 ...4.75
Sharon, Pa. S3 ...5.20
So. Chicago, Ill. U5 ...4.75
Sparrows Point, Md. B2 ...4.75

FLOOR PLATES
Cleveland J5 ...4.75
Conshohocken, Pa. A3 ...4.75
Harrisburg, Pa. C5 ...5.95
Ind. Harbor, Ind. I-2 ...4.75
Munhall, Pa. U5 ...4.75
So. Chicago, Ill. U5 ...4.75

PLATES, Carbon Steel
Alabama City, Ala. R2 ...3.70
Aliquippa, Pa. J5 ...3.70
Ashland, Ky. (15) A10 ...3.70
Bessemer, Ala. T2 ...3.70
Clairton, Pa. U5 ...3.70
Claymont, Del. C22 ...4.15
Cleveland J5, R2 ...3.70
Coatesville, Pa. L7 ...4.15
Conshohocken, Pa. A3 ...4.15
Fairfield, Ala. T2 ...3.70
Fontana, Calif. (30) K1 ...4.30
Gary, Ind. U5 ...3.70
Granite City, Ill. G4 ...4.40
Geneva, Utah G1 ...3.70
Harrisburg, Pa. C5 ...4.95
Houston, Tex. S5 ...4.10
Ind. Harbor, Ind. I-2, Y1 ...3.70
Johnstown, Pa. B2 ...3.70
Kansas City, Mo. S5 ...4.30
Lackawanna, N.Y. B2 ...3.70
Minnequa, Colo. C10 ...4.50
Munhall, Pa. U5 ...3.70
Pittsburgh J5 ...3.70
Seattle B3 ...4.60
Sharon, Pa. S3 ...3.95
So. Chicago, Ill. U5, W14 ...3.70
Sparrows Point, Md. B2 ...3.70
Steubenville, O. W10 ...3.70
Warren, O. R2 ...3.70
Weirton, W.Va. W6 ...4.00
Youngstown R2, U5, Y1 ...3.70

PLATES, Carbon A. R.
Fontana, Calif. K1 ...5.45
Geneva, Utah G1 ...4.85

PLATES, Ingot Iron
Ashland, c.l. (15) A10 ...3.95
Ashland, lcl. (15) A10 ...4.45
Cleveland, c.l. R2 ...4.30
Warren, O. c.l. R2 ...4.30

BARS, Hot-Rolled Carbon
Alabama City, Ala. R2 ...3.70
Aliquippa, Pa. J5 ...3.70
Alton, Ill. (1) L1 ...3.95
Atlanta, Ga. A11 ...4.25
Bessemer, Ala. T2 ...3.70
Buffalo R2 ...3.70
Canton, O. R2 ...3.70
Clairton, Pa. U5 ...3.70
Cleveland R2 ...3.70
Detroit R7 ...3.85
Emeryville, Calif. J7 ...4.45
Fairfield, Ala. T2 ...3.70
Fontana, Calif. K1 ...4.40
Gary, Ind. U5 ...3.70
Houston, Tex. S5 ...4.10
Ind. Harbor, Ind. I-2, Y1 ...3.70
Johnstown, Pa. B2 ...3.70
Kansas City, Mo. S5 ...4.30
Lackawanna, N.Y. B2 ...3.70
Los Angeles, Calif. B3 ...4.40
Milton, Pa. B6 ...4.20
Minnequa, Colo. C10 ...4.15
Niles, Calif. P1 ...5.05
N. Tonawanda, N.Y. B11 ...3.70
Pittsburg, Calif. C11 ...4.40
Pittsburgh J5 ...3.70
Portland, Oreg. O4 ...4.65
Seattle B3, N14 ...4.45
So. Chicago R2, U5, W14 ...3.70
So. Duquesne, Pa. U5 ...3.70
So. San Fran., Cal. B3 ...4.45
Struthers, O. Y1 ...3.70
Torrance, Calif. C11 ...4.40
Weirton, W.Va. W6 ...3.85
Youngstown R2, U5 ...3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa, Pa. J5 ...3.70
Atlanta A11 ...4.25
Johnstown, Pa. B2 ...3.70
Lackawanna, N.Y. B2 ...3.70
Niles, Calif. P1 ...5.05
Portland, Oreg. O4 ...4.65
San Francisco S7 ...4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem, Pa. B2 ...3.90

BARS, Hot-Rolled Alloy
Bethlehem, Pa. B2 ...4.30
Buffalo R2 ...4.30
Canton, O. R2 ...4.30
Canton, O. (29) T7 ...3.95
Clairton, Pa. U5 ...4.30
Detroit R7 ...4.45
Ecorse, Mich. G5 ...4.65
Fontana, Calif. K1 ...5.35
Gary, Ind. U5 ...4.30
Houston, Tex. S5 ...4.70
Ind. Harbor, Ind. I-2, Y1 ...4.30
Johnstown, Pa. B2 ...4.30
Kansas City, Mo. S5 ...4.90
Lackawanna, N.Y. B2 ...4.30
Los Angeles B3 ...5.35
Massillon, O. R2 ...4.30
Midland, Pa. C18 ...4.30
So. Chicago R2, U5, W14 ...4.30
So. Duquesne, Pa. U5 ...4.30
Struthers, O. Y1 ...4.30
Warren, O. C17 ...4.30
Youngstown U5 ...4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton, Pa. U5 ...4.55
Gary, Ind. U5 ...4.55
Youngstown U5 ...4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa, Pa. J5 ...5.55
Bessemer, Ala. T2 ...5.55
Bethlehem, Pa. B2 ...5.55
Clairton, Pa. U5 ...5.55
Cleveland R2 ...5.55
Fairfield, Ala. T2 ...5.55
Fontana, Calif. K1 ...6.60
Gary, Ind. U5 ...5.55
Ind. Harbor, Ind. I-2 ...5.55
Indiana Harbor, Ind. Y1 ...6.05
Johnstown, Pa. B2 ...5.55
Lackawanna, N.Y. B2 ...5.55
Los Angeles B3 ...6.25
Pittsburgh J5 ...5.55
Seattle B3 ...6.30
So. Duquesne, Pa. U5 ...5.55
So. San Francisco B3 ...6.30
Struthers, O. Y1 ...6.05
Youngstown U5 ...5.55

BARS, Cold-Finished Carbon
Ambridge, Pa. W18 ...4.55
Beaver Falls, Pa. M12, R2 ...4.55
Buffalo B6 ...4.60
Camden, N.J. P13 ...5.00
Carnegie, Pa. C12 ...4.55
Chicago W18 ...4.55
Cleveland A7, C20 ...4.55
Detroit P17 ...4.70
Donora, Pa. A7 ...4.55
Elyria, O. W8 ...4.55
Franklin Park, Ill. N5 ...4.55
Gary, Ind. R2 ...4.55
Green Bay, Wis. F7 ...4.55
Hammond, Ind. L2, M13 ...4.55
Hartford, Conn. R2 ...5.10
Harvey, Ill. B5 ...4.55
Los Angeles R2 ...6.00
Mansfield, Mass. B5 ...5.10
Massillon, O. R2, R8 ...4.55
Monaca, Pa. S17 ...4.55
Newark, N.J. W18 ...5.00
Plymouth, Mich. P5 ...4.80
Pittsburgh J5 ...4.55
Putnam, Conn. W18 ...5.10
Readville, Mass. C14 ...5.10
St. Louis, Mo. M5 ...4.95
So. Chicago, Ill. W14 ...4.55
Spring City, Pa. (5) K3 ...5.00
Struthers, O. Y1 ...4.55
Waukegan, Ill. A7 ...4.55
Youngstown F3, Y1 ...4.55

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 ...5.40
Beaver Falls, Pa. M12 ...5.40
Bethlehem, Pa. B2 ...5.40
Buffalo B5 ...5.40
Camden, N.J. P13 ...5.80
Canton, O. R2 ...5.40
Canton, O. (29) T7 ...4.90
Carnegie, Pa. C12 ...5.40
Chicago W18 ...5.40
Cleveland A7 ...5.45
Cleveland C20 ...5.40
Detroit P17 ...5.55
Donora, Pa. A7 ...5.45
Elyria, O. W8 ...5.40
Gary, Ind. R2 ...5.40
Hammond, Ind. L2, M13 ...5.40
Hartford, Conn. R2 ...5.85
Harvey, Ill. B5 ...5.40
Lackawanna, N.Y. B2 ...5.40
Mansfield, Mass. B5 ...5.85
Massillon, O. R2, R8 ...5.40
Midland, Pa. C18 ...5.40
Monaca, Pa. S17 ...5.40
Newark, N.J. W18 ...5.75
Plymouth, Mich. P5 ...5.60
So. Chicago, Ill. R2, W14 ...5.40
Struthers, O. Y1 ...5.40
Warren, O. C17 ...5.40
Waukegan, Ill. A7 ...5.45
Worcester, Mass. A7 ...5.75
Youngstown F3, Y1 ...5.40

RAIL STEEL BARS
Chicago Hts. (3, 4) I-2, C2 ...4.75
Franklin, Pa. (3, 4) F5 ...4.75
Fort Worth, Tex. (26) T4 ...5.40
Huntingtn, W.Va. (3) W7 ...5.50
Marion, O. (3) P11 ...4.75
Moline, Ill. (3) R2 ...3.80
Tonawanda (3, 4) B12 ...4.75
Williamsport (3) S19 ...5.00
Williamsport (4) S19 ...5.10

BARS, Wrought Iron
Dover, N.J. (Staybolt) U1 ...15.00
Dover, (Eng. Bolt) U1 ...13.50
Dover (Wrgt. Iron) U1 ...12.25
Economy, Pa. (S.R.) B14 ...9.60
Economy, Pa. (D.R.) B14 ...11.90
Economy (Staybolt) B14 ...12.20
McK. Rks. (Staybolt) L5 ...14.50
McK. Rks. (S.R.) L5 ...9.60
McK. Rks. (D.R.) L5 ...13.00

BARS, Reinforcing (Fabricators)
Alabama City, Ala. R2 ...3.70
Alton, Ill. (6) L1 ...3.70
Atlanta A11 ...4.25
Buffalo R2 ...3.70
Cleveland R2 ...3.70
Emeryville, Calif. J7 ...4.45
Fairfield, Ala. T2 ...3.70
Fontana, Calif. K1 ...4.40
Gary, Ind. U5 ...3.70
Houston, Tex. S5 ...4.10
Ind. Harbor, Ind. I-2, Y1 ...3.70
Johnstown, Pa. B2 ...3.70
Kansas City, Mo. S5 ...4.30
Lackawanna, N.Y. B2 ...3.70
Los Angeles B3 ...4.40
Milton, Pa. B6 ...4.20
Minnequa, Colo. C10 ...4.50
Niles, Calif. P1 ...5.05
Pittsburg, Calif. C11 ...4.40
Pittsburgh J5 ...3.70
Portland, Oreg. O4 ...4.65
Seattle B3, N14 ...4.45
So. Chicago, Ill. R2 ...3.70
So. Duquesne, Pa. U5 ...3.70
So. San Francisco B3 ...4.45
Sparrows Point, Md. B2 ...3.70
Struthers, O. Y1 ...3.70
Torrance, Calif. C11 ...4.40
Youngstown R2, U5 ...3.70

BARS, Reinforcing (Fabricated; to Consumers)
Huntington, W.Va. W7 ...5.50
Johnstown, ¼-1" B2 ...4.75
Los Angeles B3 ...5.45
Marion, O. P11 ...5.00
Seattle B3, N14 ...5.55
So. San Francisco B3 ...5.45
Sparrows Pt., ¼-1" B2 ...4.75
Williamsport, Pa. S19 ...5.10

SHEETS, Hot-Rolled Steel (18 gage and heavier)
Alabama City, Ala. R2 ...3.60
Ashland, Ky. (8) A10 ...3.60
Butler, Pa. A10 ...3.60
Cleveland J5, R2 ...3.60
Conshohocken, Pa. A3 ...4.00
Detroit M1 ...4.40
Ecorse, Mich. (8) G5 ...3.80
Fairfield, Ala. T2 ...3.60
Fontana, Calif. K1 ...4.55
Gary, Ind. U5 ...3.60
Geneva, Utah G1 ...3.70
Granite City, Ill. G4 ...4.30
Ind. Harbor, Ind. I-2, Y1 ...3.60
Irvin, Pa. U5 ...3.60
Lackawanna, N.Y. B2 ...3.60
Munhall, Pa. U5 ...3.60
Niles, O. N12 ...5.25
Pittsburg, Calif. C11 ...4.30
Pittsburgh J5 ...3.60
Sharon, Pa. S3 ...4.00
So. Chicago, Ill. W14 ...3.60
Sparrows Point, Md. B2 ...3.60
Steubenville, O. W10 ...3.60
Torrance, Calif. C11 ...4.30
Warren, O. R2 ...3.60
Weirton, W.Va. W6 ...3.60
West Leechburg, Pa. A4 ...3.75
Youngstown U5, Y1 ...3.60

SHEETS, H.R. (19 gage)
Alabama City, Ala. R2 ...4.75
Dover, O. R1 ...5.65
Ind. Harbor, Ind. I-2 ...5.40
Mansfield, O. E6 ...5.65
Niles, O. N12 ...5.75
Torrance, Calif. C11 ...5.40

SHEETS, H.R (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ...5.40
Conshohocken, Pa. A3 ...5.65
Ecorse, Mich. G5 ...5.95
Fairfield, Ala. T2 ...5.40
Fontana, Calif. K1 ...6.35
Gary, Ind. U5 ...5.40
Ind. Harbor, Ind. I-2 ...5.40
Indiana Harbor, Ind. Y1 ...5.90
Irvin, Pa. U5 ...5.40
Lackawanna (35) B2 ...5.40
Pittsburgh J5 ...5.40
Sharon, Pa. S3 ...5.40
So. Chicago, Ill. U5 ...5.40
Sparrows Point (36) B2 ...5.40
Warren, O. R2 ...5.40
Weirton, W.Va. W6 ...5.75
Youngstown U5 ...5.40
Youngstown Y1 ...5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ...6.55
Ecorse, Mich. G5 ...7.10
Fontana, Calif. K1 ...7.50
Gary, Ind. U5 ...6.55
Indiana Harbor, Ind. Y1 ...7.05
Indiana Harbor, Ind. I-2 ...6.55
Irvin, Pa. U5 ...6.55
Lackawanna (37) B2 ...6.55
Pittsburgh J5 ...6.55
Sparrows Point (38) B2 ...6.55
Warren, O. R2 ...6.55
Weirton, W.Va. W6 ...6.90
Youngstown Y1 ...7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

Alabama City,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb coated)

Gary,Ind. U5	9.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, LONG Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland A10	5.60	...
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom W10 (cut lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill. G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren R2	8.45	8.70
Weirton W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	6.10
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.30
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(4) L1	3.75
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
N.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.60
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea, O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol, Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.60	6.60	7.55	9.50	11.95
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	...	7.10	7.70	9.65
Pawtucket,R.I. N8:					
Cleve.-or-Pitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.85
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton, N. J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork, W3	...	...	10.30	12.50	15.35

STRIP, Hot-Rolled Carbon

NewBritn.Conn.(10) S15	10.75
Pawtucket,R.I.(4) N8	10.75
Pawtucket,R.I.(4) N8	11.65
Sharon,Pa. S3	10.60
Worcester,Mass. T6	10.95
Youngstown C8	10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.55
Berea,O. C7	5.55
Bridgeprt,Conn.(10) S15	5.25
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.60
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.85
Fontana,Calif. K1	6.50
FranklinPark,Ill.(40) T6	4.95
Ind.Harbor,Ind. I-2	4.65
Lackawanna,N.Y. B2	4.65
LosAngeles C1	4.90
Mattapan,Mass. T6	5.55
Middletown,O. A10	4.65
NewBritain(10) S15	4.65
NewCastle,Pa. B4	4.65
NewCastle(40) E5	5.45
NewHaven,Conn. D2	5.45
NewHaven,Conn. A7	5.55
Pawtucket,R.I. R3	5.55
Pawtucket,R.I.(21) N8	5.55
Riverdale,Ill.(40) A1	4.85
Rome,N.Y. R6	4.65
Sharon,Pa. S3	4.65
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	5.55
Wallingford,Conn. W2	5.55
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.45
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.95
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot Rolled Ingot Iron

Ashland,Ky. (S) A10	3.75
Warren,O. R2	4.10

Strip, Cold Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Kansas City, Mo. S5	3.90
Sharon,Pa. S3	4.15
Youngstown U5	3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19)K4	5.70	6.15
Buffalo W12	4.85	...
Cleveland A7	5.70	6.15
Crawfordsville M8	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCity, Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	...
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	...
Pitts.Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
Sparrows Pt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	...
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvle MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt.B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Cleveland A7	8.55	8.80
Donora,Pa. A7	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
NewHaven A7	8.85	8.10
Palmer,Mass. W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Trenton,N.J. A7	8.85	9.10
Waukegan,Ill. A7	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill.(1) L1	4.85
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Pa. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8ga. I-1	5.50
No. Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So. SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester A7	6.65
Worcester T6	6.50
Worcester W12	6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N. J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Galv'd ACSR For Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling,N.J. R5	11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill.(1) L1	6.25
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Millbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill R2	6.25
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester A7, T6, W12	6.55
Worcester,Mass. J4	6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Buffalo W12	5.90
Cleveland, A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	7.10
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	7.10
Trenton,N.J. A7	6.20
Wankegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	126
Ala City,Ala.,17-18ga.R2	213
Aliquippa,Pa.9-14½ga.J5	130
Atlanta A11	133
Bartonville,Ill.(19) K4	130
Crawfordsville,Ind. MS	132
Donora,Pa. A7	130
Duluth A7	130
Fairfield,Ala. T2	130
Houston,Tex. S5	138
Johnstown,Pa. B2	130
Johnstown,17ga.,6" B2	204
Johnstown,17ga.,4" B2	207
Joliet,Ill. A7	130
KansasCity,Mo. S5	142
Kokomo,Ind. C16	132
Minnequa,Colo. C10	138
Monessen,Pa. P7	135
Pittsburg,Calif. C11	153
Portsmouth,O.(18) P12	137
Rankin,Pa. A7	130
So.Chicago,Ill. R2	126
Sterling,Ill.(1) N15	139

FENCE POSTS Col.

ChicagoHts.,Ill. C2	140
Duluth A7	125
Franklin,Pa. F5	140
Huntingtor,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago R2	140
Tonawanda B12	140
Williamsport,Pa. S19	150

WIRE, Barbed Col.

AlabamaCity,Ala. R2	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4	143
Crawfordsville MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity, Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(18) P12	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10	160
SparrowsPoint,Md. B2	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop Col.

AlabamaCity, Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville MS	132
Donora,Pa. A7	123
Duluth A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	6.10
Bartonville,Ill.(19) K4	5.95
Crawfordsville,Ind. MS	6.30
Donora,Pa. A7	5.95
Duluth A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg)
To dealers (33)

Conshonocken,Pa. A3	$7.35
Wheeling,W.Va. W10	7.15

NAILS & STAPLES, Stock
To dealers & mfrs. (7) Col.

AlabamaCity,Ala. R2	118
Aliquippa,Pa.(15) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. MS	122
Donora,Pa. A7	118
Duluth A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.50
Lebanon,Pa.(32) B2	9.50
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	To 10

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

AXLES

Ind.Harbor,Ind. S18	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)	4.00
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

Key to Producers

M1 McLouth Steel Corp.
M4 Manoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O5 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts.Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	23.00	13.5W.4Cr.3V	140.00
Extra Carbon	27.00	18W.4Cr.2V.9Co	217.50
Spec. Carbon	32.50	19W.4Cr.2V.7Co	217.50
Oil Hardening	35.00	18.25W.4.25Cr.1V.4.75Co	185.50
Cr Hot Wrk	35.00	20.2W.4.25Cr.1.6V.12.25Co	323.00
Hi-Carbon-Cr	63.50	1.5W.4Cr.1V.8.5Mo	78.50
18W.4Cr.1V	123.50	6.4W.4.5Cr.1.9V.5Mo	87.00
18W.4Cr.2V	138.00	6W.4Cr.3V.6Mo	109.50

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 8 Ga. 36" wide.
(24) Deduct 0.20c finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, to fabricators (elec. furn. billet, 5.40c); to consumers, 6.15c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. edge or square edge.
(33) To others, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter: 60" & narrower.
(38) 14 gage & lighter: 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.56	0.24	34.0	32.0	29.0	15	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	−7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	32.0	14.0	12.0	13.0
¾	11.5	1.13	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.5
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ¾-3", F6; Benwood, W. Va., 3½ points lower on ¾", 1½ points lower on ¼" and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ⅜" and larger continuous weld and 21½ on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ⅛" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ¼-⅜"; Benwood, W. Va. W10, except plus 3½% on ¼", plus 2½% on ⅜", plus 9% on ½"; Sharon, Pa. M6, plus 0.5 on ⅜", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16½% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5 quotes 1 point lower on ½", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3", Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.00	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.00	10.89	34.5	14.5	34.5	14.5
5	148	14.81	37.0	17.0	37.0	17.0
6	192	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain, N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill, minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1⅝	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2⅝	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip— Cold-Rolled Carbon Base 10%	Strip— Cold-Rolled Carbon Base Both Sides	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Sheets— Cu Base Both Sides
302					19.75	27.50	77.00
304	25.00	28.00			20.75	27.50	77.00
		29.50			24.50		
309	30.50	35.00					
310	36.50	41.00					144.00
316	29.50	31.50			26.00	36.50	
		34.00					
317	34.50	39.00					
318	38.50	38.00					
321	26.50	31.00			23.00	33.00	111.00
347	27.50	30.50			24.00	33.50	130.00
		32.00					
405	21.25	27.75					
410	20.75	27.25					
Nickel	33.25	44.25	41.00	54.00			
Inconel	41.00	53.50					165.00
Monel	34.75	45.75					
Copper*			23.70†	29.65†			

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. I-7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville I-7; nickel, monel, copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent on list for less than case lots to consumers)

6 in. and shorter:

⅜-in. & smaller diam.	15
⅞-in. & ½-in.	18.5
⅝-in. and larger	14.0
Longer than 6 in.	
All diams.	14
Lag bolts, all diams. 6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	42
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Heavy
½-in. & smaller	15	15
⅝-in. & ¾-in.	12	6.5
⅞-in.-1½-in.	9	1
1⅛ in. & larger	7.5	1
H.P. Hex:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	16.5	6.5
⅞-in.-1½-in.	12	2
1⅛ in. & larger	8.5	2
C.P. Hex:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	23	17.5
⅞-in. & 1½-in.	19.5	12
1⅛-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1½-in.	24	15
1⅛-in. & larger	13	8.5
	Light	
½-in. & smaller	35	
⅝-in. to ¾-in.	28.5	
⅞-in. to 1½-in.	26	

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged, per cent off list)

6 in. or shorter:

⅜-in. & smaller	42
½-in. through 1 in.	34
Longer than 6 in.:	
⅜-in. & smaller	26
½-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

⅞-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-50c.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
4.5⅛	40	21.50
3	40	22.61
2½	24,30	23.15
2	24,30	25.36

CARBON

40	100,110	8.03
35	100,110	8.03
30	84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03
14	60,72	8.57
10,12	60	8.84

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.00	36.50	31.25
303	43.00	40.00	33.75
304	43.00	38.50	32.75
309	55.50	54.50	44.25
316	56.50	58.50	48.75
321	49.00	48.00	36.75
347	53.50	52.00	41.25
410	36.50	36.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Baltimore, Types 301 through 347 sheet, except 309 E2.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502, S18.

Cleveland, strip A7.

Detroit, strip, except Types 309, 321, 416, 420, 501 and 502 M1.

Dunkirk, N.Y., bars, wire A4.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip C18.

McKeesport, Pa., bars, sheets except Type 416 U5.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., bars and strip, except 55.5c for Type 309 strip and 44.75c for Type 309 bars, C4.

Sharon, Pa., strip, except Types 303, 309, 316, 416, 501 and 502 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip, except Type 309 sheets 56.00c and bars 44.75c, J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 61.50c, strip 63.00c, W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg...26.00-33.00

Industrial xylol ..25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ..17.25

Do., less than carlots..18.00

Do., tank cars 15.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

MORE

METAL POWDERS

(Per pound, f.o.b. point in ton lots, 100 mesh, except otherwise noted.)

Sponge iron:

98+% Fe, carlots

Swedish, c.i.f. York, in bags

Electrolytic Iron:

Annealed, 99.9+% Fe

Unannealed, 99 Fe

Unannealed, 99 Ferminus 325 mesh

Powder Flakes

Carbonyl Iron:

97.9-99.8% size 10 to 16 microns

Aluminum:

Carlots, freight allowed

Atomized, 500 lb drums, freight allowed

Brass, 10-ton lots

Bronze, 10-ton lots

Phosphor-Copper, 10 tons

Copper:

Electrolytic

Reduced

Lead

Manganese:

Minus 100-mesh

Minus 35 mesh

Minus 200 mesh

Nickel unannealed

Nickel-Silver, 10-ton lots

Silicon

Solder (plus cost of metal)

Stainless Steel, 302

Tin

Zinc, 10-ton lots

Tungsten: Dollars

99%, minus 80 to 200 mesh, freight allowed:

1000 lb and over

Less than 1000 lb

98.8% minus 65 mesh, freight allowed:

1000 lb. and over

less than 1000 lb.

Molybdenum:

99%, minus 80 to 200 mesh:

over 500 lb.

200 to 500 lb.

less than 200 lb

Chromium, electrolytic 99% Cr min.

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll.fur. $14.50-15.00

Connellsvll.fdry. 17.00-18.00

New River, foundry 19.50

Wise county, foundry 15.95

Wise county, furnace 15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens $22.75

Everett, Mass., ovens

New England, del. 24.80

Chicago, ovens 21.00

Chicago, del. 22.45

Detroit, del. 24.91

Terre Haute, ovens 22.50

Milwaukee, ovens 23.75

Indianapolis, oven 22.75

Chicago, del. 26.62

Cincinnati, del. 25.67

Detroit, del. 26.65

Ironton, O., ovens 21.50

Cincinnati, del. 24.06

Painesville, O., ovens 24.00

Cleveland, del. 25.72

Erie, Pa., ovens 23.50

Birmingham, ovens 20.50

Birmingham, del. 21.69

Philadelphia, ovens 22.70

Nevillelsland,Pa.,ovens 23.00

Swedeland, Pa., ovens 22.00

St. Louis, ovens 23.25

St. Louis, del. 25.38

Portsmouth, O., ovens 21.50

Cincinnati, del. 24.06

Detroit, ovens 24.00

Detroit, del. *25.00

Buffalo, del. 26.69

Flint, del. 26.44

Pontiac, del. 25.29

Saginaw, del. 26.75

Includes representative switching charge of *, $1.00; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. Of within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York (c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	7.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	6.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.56	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65‡‡§	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45‡‡§	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10‡‡	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08‡‡§	5.78	5.93	7.13
St. L. (w'hse)	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88‡‡§	5.58	5.73	6.93
Kans. City (city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity (w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Omaha, Nebr.	6.13†	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.85
Birm'ham (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80§	8.90‡	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60‡	9.20‡	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded); and Los Angeles (gage extra excluded); ‡ includes extra for *10 gage*; § as rolled; ‡‡ as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ¹—500 to 1499 lb; ²—450 to 1499 lb; ³—3500 lb and over; ⁴—1000 to 1999 lb.

REFRACTORIES

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa. $99.60. Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, O., Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

MALLEABLE BUNG BRICK

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

BASIC BRICK

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

MAGNESITE

Per net ton, Chewelah, Wash. Domestic dead-burned, ¾" grains; bulk, $36.30; single paper bags, $41.80.

DOLOMITE

Per net ton. Domestic, burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Nario, Clay Center, Woodville, Gibsonburg, Bettsville, O.; Billmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural); lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$38-$39
Domestic scheelite, del.	nominal

MANGANESE ORE

Indian manganese, 46-48%, nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00
South African Transvaal	
44% no ratio	$24.00-25.00
45% no ratio	20.00
48% no ratio	31.00-32.00
50% no ratio	28.00-28.50
Brazilian	
44% 2.5:1 lump	$32.00
Rhodesian	
45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., Welland, Ont., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa., $190, Chattanooga, Tenn. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244 f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lot 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices. Ic for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

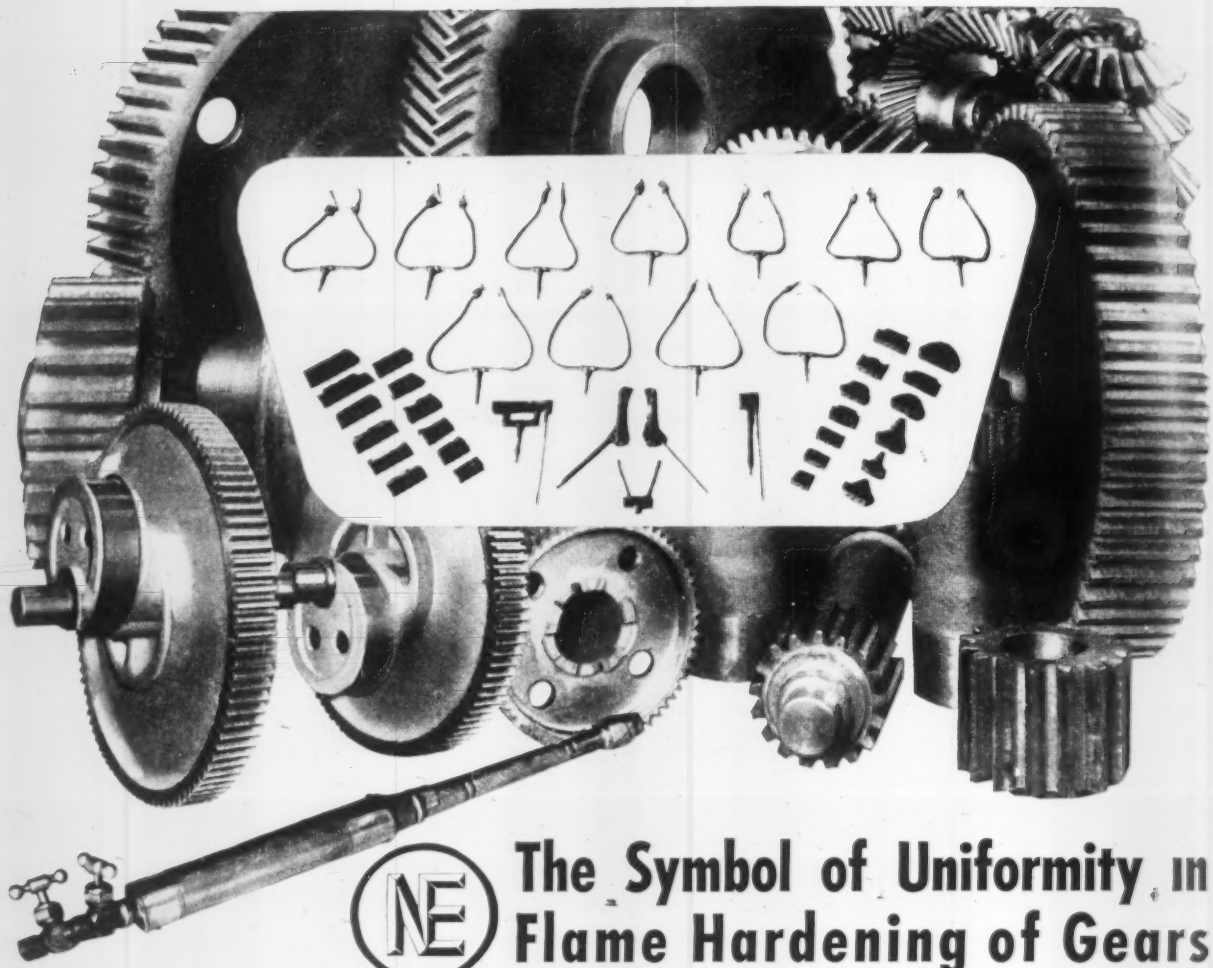
Silicomanganese: (Mn 65-68%). Contract, lump bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 21.75c per lb of contained Cr, c.l., packed 22.65c, ton lot 23.80c, less ton 25.20c. Delivered. Spot, add 0.25c.

"SM" Ferrochrome: (Cr 60-65% Si 4-6%, Mn

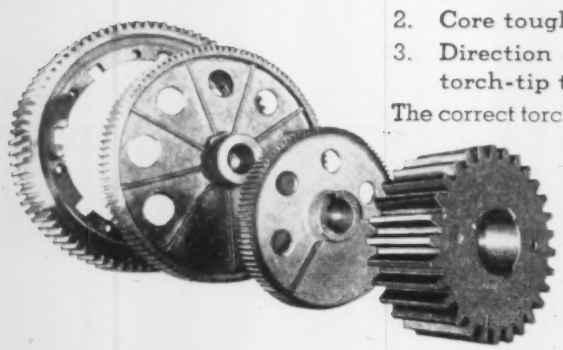
(Please turn to page 150)



The Symbol of Uniformity in Flame Hardening of Gears

National-Erie engineers have developed a range of torch-tip sizes to fit gear tooth sizes for flame hardening Neloy and Neloy Moly alloy steel gears and pinions. These tips are used in our flame hardening process to assure three important results:

1. Uniform penetration of hardness to the **proper depth** for a given tooth size.
2. Core toughness that is **always uniform.**
3. Direction of **constantly uniform flame** to the tooth, from a torch-tip that exactly fits that tooth size.



The correct torch tip plus National-Erie skill in the flame hardening of gears, assures the combination of a high surface hardness comparable to the carburizing or case hardened treatment, with a core toughness to resist impact loads of a fully quenched medium carbon alloy steel.

You can depend upon National-Erie equipment, skill and procedure when you place your specification gearing requirements with us. Write for bulletin No. 9.

NATIONAL ERIE CORPORATION

ERIE, PENNSYLVANIA • U. S. A.

The Metal Market

Government assumes complete control over importation of pig tin and will enforce full allocation after May 1. Effects price stabilization in domestic market

STABLIZATION of the domestic tin market was effected last week. Effective May 12, Reconstruction Finance Corp. became the sole importer of tin and its initial offering price under the new set up was $1.34. Previously, the agency had sold its tin to industry on the basis of the average price prevailing for the week following that in which the sale was made. Although there is no assurance RFC will maintain that price level, consumers will no longer be plagued with daily fluctuations.

RFC's price is below the import basis and producers of tin-bearing alloy ingots and plating materials are still hampered in quoting prices on special mixtures, pending a more definite government price policy.

The only private concerns that are permitted to import tin are those which National Production Authority specifically authorizes to do so and those firms which executed a contract for foreign tin before Mar. 12, provided they report details of such contracts to NPA before Mar. 24.

Complete allocation of pig tin among domestic users becomes effective May 1. The allocations generally will give users more tin than they got in February and March. Anyone wishing to deliver or accept delivery of pig tin after that date will first have to have a specific allocation authorization from NPA. Allocation authorizations will be sent to appropriate suppliers who have their applications in by the 20th day of the month preceding that in which delivery is sought. Persons desiring to purchase pig tin will be notified by NPA when the allocation authorizations are made to their suppliers.

Plans for allocation on a worldwide basis are being formulated by representatives of Britain, the Netherlands, Belgium and this country. Bolivia, which has committed all its production to the United States at the New York market price, was not represented at the Washington meeting held last week.

Bolivia must obtain a comparatively high price to carry out its plans for development of large reserves of low grade ores. RFC officials have issued no statement on their tin purchase contracts with Indonesia and Belgian Congo producers. These contracts contain an "escape clause" which allows the RFC to withdraw from buying when the market for tin exceeds $1.03 a pound.

Tin Allocations Increased

Manufacturers of tin plate and terne plate will be permitted in each month of the second quarter to use up to 95 per cent of their average monthly use of pig tin in the first half of 1950. In February and March, they were restricted to 80 per cent of that amount. NPA says it is simply making an allowance for the normal boosts in tin requirements of the perishable food canning industry. After the peak canning season passes, NPA likely will cut back on the amount of tin that will be permitted for civilian uses to or below levels prevailing in February and March.

All other users of pig tin will be permitted in each month of the second quarter to use up to 90 per cent of their average monthly use in the first half of 1950. In February and March they were restricted to 80 per cent.

The new tin order, amendment 3 to M-8, does not change the specifications for tin cans in different products as they were set forth late in January. However, watch for modifications of NPA's list of food products that can use cans. These modifications for the most part will reduce further the amount of tin that canners of certain food items will be permitted to use in the second quarter.

Less Copper in Sight

Don't look for any early relief in your copper supply problems. Confirmation of a worsening situation is being made almost daily. One of the factors causing a decline in supplies is the shortage of scrap. Brass ingot makers raised their prices to the permissible ceilings due to this shortage which prevented prices from being adjusted downward to levels projected last January. The shortage is also reflected in the February statistical report issued by the Copper Institute, showing a drop in secondary copper production to only 3967 tons compared with 5224 tons in January and a monthly average of 9787 tons in 1950.

Production of refined copper dropped to 101,199 tons in February from 110,144 tons in January. This decline in production, coupled with increased requirements under the defense program, accounts for the necessity in reducing your use of the metal in civilian goods. These restrictions have permitted a rise in refined stocks to 59,324 tons at the end of last month from 54,883 tons in January, since deliveries were cut to 99,630 tons from 108,128 tons in January and 121,954 tons in December.

If the government is successful in its efforts to import larger tonnages of copper, the bulk will flow into war materiel channels. The State Department is dickering with Chile about getting more copper. Chilean representatives say they can boost output from the present rate of 350,000 tons a year to about 500,000 tons, but they want United States help to do it. They suggest that the price of copper be raised to 27.00c or 28.00c a pound and they want some of the copper produced by American-owned companies in Chile made available for sale to countries other than the United States.

National Production Authority amended its copper order to permit mining firms, as well as manufacturers and construction outfits, to automatically adjust their own base periods, if they suffered suspension of operations of more than 15 consecutive days in the first half of 1950.

Zinc Production Declines

Consumption of zinc in civilian goods industries will be reduced as a result of a drop in available supplies, if not by actual tightening in NPA's restrictions. Smelter production last month declined to only 70,285 tons from 80,937 tons in January, while shipments dropped to 69,380 tons from 79,609. Unfilled orders on smelters' books at the end of February amounted to 76,146 tons while stocks totaled only 11,117 tons. Stocks in the hands of consumers are below 30-days' requirements, although they are permitted to accumulate a 45-days' supply.

Tightens Export Restrictions

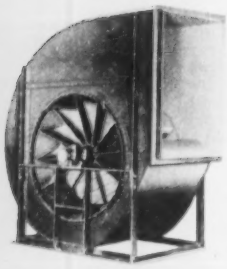
Close supervision of the exportation of nonferrous metals and minerals is being maintained by Office of International Trade, Washington. These include aluminum, copper, brass and bronze, zinc, lead, nickel, tin, and their manufactures and certain ferroalloys. If you wish to export these materials you must submit evidence of availability.

Evidence of availability alone will not entitle you to export licenses. Such factors as the overall amount of material available for export, the end use of the exports, and the ultimate destination of the shipments are considered by OIT in screening license applications. In general, OIT applies the end use restrictions established for domestic users by the National Production Authority.

Licenses to export 29,500 tons of copper were issued to Mar. 7 against the 30,000-ton export allocation for the first quarter.

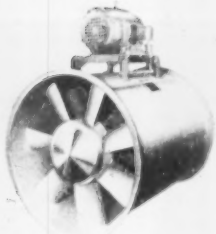
Shipments of these tonnages do not represent an actual reduction in the amount of metal available for your civilian operations. Virtually all exported copper shapes and products are made of copper refined in the United States from imported ores, much of which otherwise would be refined abroad. In addition to obtaining foreign copper ores, the United States receives such strategic materials as zinc, tin, manganese and other commodities in return for refined copper.

Most of the licenses issued for export of 3500 tons of aluminum in the first quarter specify sheet, plate and strip, with a negligible number for secondary aluminum ingot.



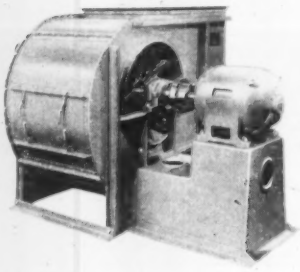
LIMIT-LOAD FANS

For large-scale ventilation. Quiet, non-overloading. Sizes up to 500,000 c.f.m. Bulletin 3675.



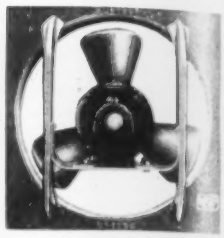
AXIAL FLOW FANS

For light-duty ventilation and air conditioning service. Compact, non-overloading. Bulletin 3555-C.



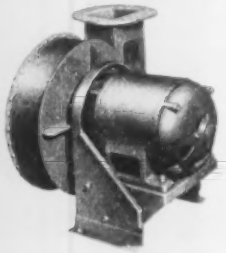
POWER PLANT FANS

Primary, forced draft, induced draft — built for the severest service. Bulletin 3750.



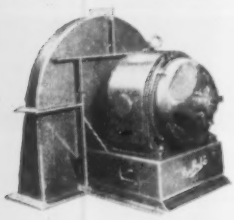
BREEZO FANS

Easy-to-install wall fans. Durable and very economical. 6 sizes. Bulletin 5222-F.



TYPE "CB" PRESSURE BLOWERS

For single-stage pressure blowing up to 2½ pounds per square inch. Bulletin 3553-A.

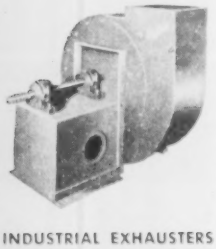


TYPE "CC" PRESSURE BLOWERS

In sizes for pressures up to 4 pounds and capacities up to 75,000 c.f.m. Bulletin 3553-A.

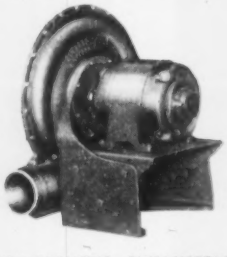
BABY CONOIDAL FANS

Compact, for portable or duct-connected service. Quiet, efficient. Bulletin 5499.



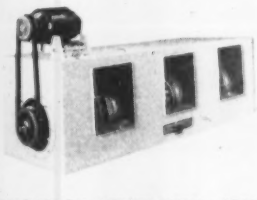
INDUSTRIAL EXHAUSTERS

With interchangeable wheels for air exhausting or materials conveying. All-welded. Bulletin 3576.



"E" BLOWERS—EXHAUSTERS

For oil or gas furnace blowing, line boosting, cleaning. Bulletin 3014-C.

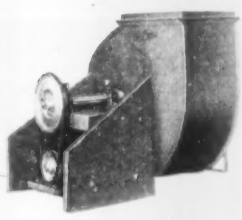


SHORTBOY VENTILATING SETS

New high efficiency all-aluminum blowers with hollow shaft. Bulletin 3701.

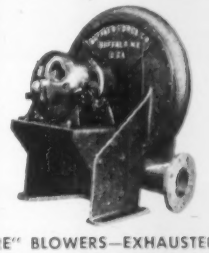
VOLUME FANS

For blowing or exhausting, up to 10" s.p. 8 discharge positions. Bulletin 3615-A.



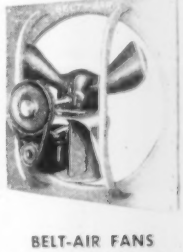
BELTED VENT SETS

Compact, "package" fans for duct or free-air delivery. Non-overloading. Bulletin 3720.



"RE" BLOWERS—EXHAUSTERS

Larger versions of "Buffalo" "E" Blowers, in sizes from 50 to 1600 c.f.m., for pressures up to 40" of water.



BELT-AIR FANS

Efficient, quiet wall fans for free air delivery up to 19,000 c.f.m. Bulletin 5222-F.

"Buffalo" BUILDS THE *RIGHT* FAN FOR THE JOB

Whether you need to ventilate a small room or an entire factory — clean tools with air or give your boiler system the most efficient mechanical draft — "Buffalo" builds the fan for the job! And whatever "Buffalo" fan you pick, you can know that its performance is backed by 73 years of "air know-how". Take a look at the fans shown here, and write us for engineering bulletins by number on any that might fit your particular application!

BUFFALO FORGE COMPANY

158 MORTIMER STREET, BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Branch Offices in all Principal Cities

—And For PUMPS . . .

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BUFFALO PUMPS, INC.

158 MORTIMER STREET, BUFFALO, NEW YORK

Canada Pumps, Inc., Kitchener, Ont.

Branch Offices in all Principal Cities

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 30.00-30.50c; No. 12 foundry alloy (No. 2 grade) 29.50-30.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 32.00c; grade 2, 30.00-30.25c; grade 3, 29.00-29.50c; grade 4, 28.50-29.00c. Prices include freight at c.l. rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 134.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 50.50c; 25-lb pigs, 53.15c; "XX" nickel shot, 54.15c; "F" nickel shot or ingots, for addition to cast iron, 51.00c. Prices include import duty.

Mercury: Open market, spot, large lots, New York, $216-$220 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.35 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90.16c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 41.03; yellow brass 37.84; commercial bronze, 95%, 40.99; 90%, 40.55; red brass, 85%, 39.59; 80%, 39.15; best quality, 39.15; nickel silver, 18%, 51.91-52.36; phosphor-bronze grade A, 5%, 60.20-62.82.

Rod: Copper, hot-rolled 36.88; cold-drawn 38.13; yellow brass free cutting, 32.23; commercial bronze, 95%, 40.68; 90%, 40.24; red brass 85%, 39.28; 80%, 38.84.

Seamless Tubing: Copper 41.07; yellow brass 40.85; commercial bronze, 90%, 43.21; red brass, 85% 42.50.

Wire: Yellow brass 38.13; commercial bronze, 95%, 41.28; 90%, 40.84; red brass, 85%, 39.88; 80%, 39.44; best quality brass, 39.44.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.295; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60, l.c.l. 30.10, 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal—— 17S-T4
0.125	52.0	...	...
0.156-0.188	44.0	...	...
0.219-0.313	41.5	...	...
0.375	40.0	46.0	48.0
0.406	40.0	...	...
0.438	40.0	46.0	48.0
0.469	40.0	...	...
0.500	40.0	46.0	48.0
0.531	40.0	...	...
0.563	40.0	...	45.0
0.594	40.0	...	...
0.625	40.0	43.5	45.0
0.688	40.0	...	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	...	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	...	...
1.625	36.5	...	39.5
1.688-2.000	36.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 71.50c. Strip, cold-rolled, 77.50c. Rods and shapes, 67.50c. Plates, 69.50c. Seamless tubes, 100.50c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 57.00c. Strip, cold-rolled 60.00c. Rods and shapes, 55.00c. Plates, 56.00c. Seamless tubes, 90.00c. Shot and blocks, 50.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 60.8c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb, 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl, 33.00c up to 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; ball, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers nom.; 100 or 300-lb drums only, 100 to 500 lb, nom.; 600 to 1900 lb, nom.; 2000 to 9900 lb, nom.; f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb, nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 20,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.00	23.00	22.25
Yellow Brass	20.125	19.875	18.75
Commercial Bronze			
95%	21.875	21.625	21.125
90%	21.75	21.50	21.00
Red brass			
85%	21.50	21.25	20.75
80%	21.375	21.125	20.625
Muntz metal	19.00	18.75	18.25
Nickel, silver, 10%	22.25	22.00	11.125
Phos. bronze, A	24.00	23.75	22.75

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 26.00-27.00; No. 2 copper 24.00-24.50; light copper 22.50-23.00; composition red brass 24.00-24.50; radiators 18.50-19.00; heavy yellow brass 18.50-19.00.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 21.50*; No. 2 copper 20.00*; light copper 19.00*; refinery brass (60% copper) per dry copper content 20.00.

* Nominal.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 23.50; No. 2 22.00; light copper 20.00; No. 1 composition red brass 20.50-21.00; No. 1 composition turnings 20.00-20.50; mixed brass turnings 13.00; new brass clippings 17.50-18.00; No. 1 brass rod turnings 16.00-16.50; light brass 15.00; clean heavy yellow brass 17.00; new brass rod ends 16.50-17.00; auto radiators 17.00-17.25; cocks and faucets, 18.00-18.50; brass pipe 18.00-19.50.

Lead: Heavy 15.75-16.00; battery plates 9.25-9.50; linotype and stereotype 17.00; electrotype 15.75-16.00; mixed babbitt 17.00.

Zinc: Old zinc 11.50-12.00; new die cast scrap 11.50-12.00; old die cast scrap 8.00-8.25.

Tin: No. 1 pewter 80.00-85.00; block tin pipe 125.00; No. 1 babbitt 75.00-80.00.

Aluminum: Clippings 2S 19.50; old sheets 16.00; crankcase 16.00; borings and turnings 12.00-12.50.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Mar. 13-15	24.50	16.80	17.50	134.00	19.00	42.00	50.50	90.16
Mar. 12	24.50	16.80	17.50	*	19.00	42.00	50.50	90.16
Mar. 9-10	24.50	16.80	17.50	134.00	19.00	42.00	50.50	90.16
Mar. 8	24.50	16.80	17.50	139.00	19.00	42.00	50.50	90.16
Mar. 7	24.50	16.80	17.50	160.00	19.00	42.00	50.50	90.16
Mar. 6	24.50	16.80	17.50	174.50	19.00	42.00	50.50	90.16
Mar. 5	24.50	16.80	17.50	179.50	19.00	42.00	50.50	90.16
Mar. 2-3	24.50	16.80	17.50	181.75	19.00	42.00	50.50	90.16
Mar. 1	24.50	16.80	17.50	181.50	19.00	42.00	50.50	90.16
Feb. Avg.	24.50	16.80	17.50	182.716	19.00	42.00	50.50	90.16
Jan. Avg.	24.50	16.80	17.50	171.798	19.00	35.462	50.50	88.890

* Nominal.

NOTE: Copper; Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, effective Feb. 7, 1951.

STEELMAKING SCRAP COMPOSITE

Mar. 15	$44.00
Mar. 8	44.00
Feb. 1951	44.00
Mar. 1950	28.23
Mar. 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade 1)

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	40.00	42.00
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 heavy melting steel) for other grades of dealer and industrial scrap.

Open-hearth and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Busheling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Electric Furnace and Foundry Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate Scrap	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
20. Foundry Steel, 2 feet and under	+ 2.00
21. Foundry Steel, 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11, 23 and 24 may be charged only when shipped to a consumer directly from an industrial producer of such grades; otherwise ceiling prices shall not exceed prices established for the corresponding grades of basic open-hearth and blast furnace scrap.
(2) Prices established for Grades 26 and 27 may be charged only when such grades are sold for use for chemical or annealing purposes; otherwise ceiling prices for such grades shall not exceed the price established for Grade 10.
(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price for such grade shall not exceed the ceiling price established for the corresponding grade of basic open-hearth.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.
(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $4; 75% and over, $6; less than 75%, $10.
(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
22. Uncut Bolsters & Side Frames	Base
23. Cut Bolsters & Side Frames	+ 3.00
24. Angle & Splice Bars	+ 5.00
25. Solid Steel Axles	+12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling price for such grade shall not exceed ceiling price established for Grade 14.
(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling price for such grade shall not exceed ceiling price established for No. 1 heavy melting steel.

CAST IRON SCRAP

Ceiling price per gross ton for any of the following grades of cast iron scrap shall be the price shown in the following table, f.o.b. shipping point.

1. Cast Iron, No. 1 (Cupola Cast)	$49.00
2. Cast Iron, No. 2 (Charging Box Cast)	47.00
3. Cast Iron, No. 3 (Heavy Breakable Cast)	45.00
4. Cast Iron, No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery Cast	52.00

Restrictions on Use

(1) Ceiling shipping point or on-line price which a basic open-hearth consumer may pay for No. 1 cast iron, No. 1 wheels, clean auto cast or malleable shall be the ceiling price established for No. 3 cast iron.
(2) Ceiling shipping point or on-line price which any foundry consumer other than a malleable iron producer may pay for Grade 10 shall be the ceiling price established for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin which is allocated by the National Production Authority to a consumer, shall be as follows:
(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 25, $6.
(5) For preparing into Grade No. 19, $6.
(6) For preparing into Grade No. 12, Grade No. 13, Grade No. 14, or Grade No. 18, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $10.
(8) For preparing into Grade No. 16 or Grade No. 20, $10.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be as follows:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 18, $7.
(6) For preparing into Grade No. 21, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron shall be limited to the following:
(1) For preparing Grade No. 8 into Grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and the consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless the consumer obtains prior written approval from OPS.

No preparation charge other than the charges set forth above may be made for the preparation of any grade of iron or steel scrap unless the consumer has secured prior written approval of such charges from OPS.

Commissions

No commissions shall be payable except by a consumer to a broker for brokerage services rendered. Where scrap is allocated by NPA other than from a government agency, the seller may designate a broker. Where scrap is allocated by NPA from a governmental agency, the consumer may designate a broker. In the event a broker purchases scrap for sale to a consumer, such consumer may pay such broker a commission not exceeding $1 a ton.

Unprepared Scrap

The term "unprepared scrap" shall not include such demolition projects as bridges, box cars or automobiles, which must be so priced that the prepared scrap will be delivered to the consumer within the established ceiling delivered prices.

For unprepared steel scrap other than materials suitable for hydraulic compression, the ceiling basing point prices shall be $8 per gross ton beneath the established ceiling price of the prepared base grades, No. 1 heavy melting or No. 1 railroad heavy melting steel.

For unprepared material which when compressed constitutes No. 1 bundles the ceiling basing point price shall be $6 per gross ton beneath the ceiling basing point price for No. 1 bundles; or when compressed constitutes No. 2 bundles the ceiling basing point price shall be $8 per ton beneath the ceiling basing point price for No. 2 bundles.

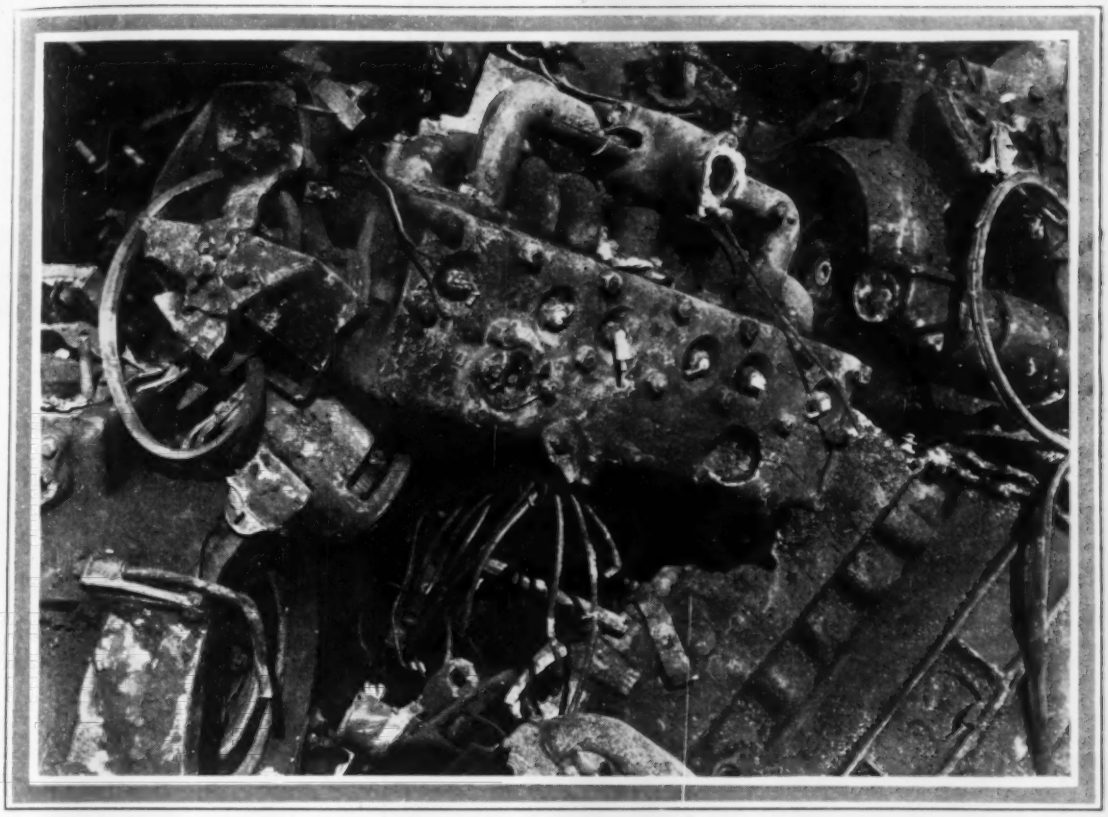
Any iron casting which cannot be broken with an ordinary drop into Grade No. 2 or Grade No. 1 may not be classified as Grade No. 3. Where such iron casting requiring blasting or other special preparation is sold to a consumer of scrap, the shipping point price for Grade No. 3 must be reduced by the amount of the additional charges required for preparation.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace use or on NPA allocation); $1 for scrap conforming to SAE 52100 when sold for electric furnace use only.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34c; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 57c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Los Angeles (including Firestone switching district), 66c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.



unstripped motor blocks

use:

Motor blocks are used as a grade of cast iron scrap in foundries and Open Hearth furnaces. Foreign material such as non-ferrous metals present in spark plugs, bearings, gaskets and steel attachments are stripped. Very often, motor blocks are bought by foundries casting new engine blocks and are thus reincarnated.

source:

Automobiles, trucks, tractors, etc.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Unstripped motor blocks from which steel and non-ferrous fittings have not been removed. Must be free from drive shafts, differentials and parts of frame.

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Tool Steel . . .

Tool Steel Prices, Page 133

Pittsburgh—Tool steel producers are seeking government assistance in obtaining vital raw materials, particularly alloys, needed in production of their products. They have asked the National Production Authority for a specific tool steel order. It is understood measures are under consideration by the control authorities to provide the tool steel interests with sufficient alloys to meet defense and related requirements.

Sheets, Strip . . .

Sheet and Strip Prices, Page 131 & 132

Pittsburgh—Rising defense requirements are putting the sheet mills under constantly increasing strain. Cutbacks in supplies to consumer durable lines, effective Apr. 1, will not materially improve the mills' position since they had already cut consumer quotas more than the 20 per cent ordered in most cases.

Sheetmakers generally are booked through June on DO account; in some cases well into summer. At the same time the tonnage available for the open market is shrinking due to increased plate rolling time on the continuous mills and further increase in DO set-aside tonnage.

The DO set-aside on hot-rolled sheets has been increased to 25 per cent from 17 and on coated sheets to 13 per cent from 10. Alloy electrical sheet and strip set-aside has been upped to 35 per cent from 7, and the set-asides on stainless hot and cold-rolled sheets have been increased to 40 per cent from 25.

Actually set-asides are much larger percentagewise than the stated percentages which are based against production in the first half of 1950 when continuous mill output was almost 100 per cent sheets. Today with plates taking a substantial part of continuous mill rolling time sheet output is down to the extent some mills' set-aside tonnage in this category runs to as much as 40 per cent of production.

Last week substantial sheet tonnage was lost in this area as result of a rail labor dispute at the local works of Jones & Laughlin Steel Corp. These mills had been turning out an average of 2000 tons of sheets daily prior to the shutdown.

New York—Further stepping up in minimum mill quotas for DO-rated tonnage was announced in time for mills generally to take the regulation into account in setting up schedules for May. This increase is expected to cover requirements of most, if not all, directive programs, which heretofore have been on a strictly allocation basis and second in preference to DO priorities. The new reserve for hot-rolled sheets is 25 per cent and for other major grades, 13 per cent. Electrical sheet and strip quotas have been jumped sharply to 35 per cent. Stringency in electrical material is pronounced. Some producers are booked up through the third quarter on the basis of the former quota. Quotas were increased on hot-rolled stainless sheets and cold-rolled stainless sheets to 40 per cent.

Boston—Heavier demand for rated tonnage has reduced May allocations of sheets and strip to civilian consumers. With carryovers, some mills have little or no tonnage for that month. Rated volume is running as high as 35 to 40 per cent with some cold strip producers, even higher on stainless. Flatware producers are shifting to straight chromium grades backlogs on which are mounting. Most cold strip mills are booked through June on rated volume. Hot rolled shipments to converters are more extended and lower under straight allocation due to increasing tonnage of rated orders.

Philadelphia—While the increases in minimum quotas for DO-rated sheet tonnage, particularly in silicon and stainless grades, should ease delivery promises on such ratings, it will not ease them as much as might be anticipated for the reason most producers were already accepting more DO-rated business than obligated to under previous quotas and because there is a constantly increasing amount of such ratings being issued.

Cleveland—Upping of the set-aside tonnage on hot-rolled sheets from 17 to 25 per cent opened some space in May for DO orders, but, of course, at the expense of supplies for the regular civilian goods trade. This latest increase in hot-rolled DO tonnage will necessitate a further reduction in cold-rolled sheet output. The supply situation in sheets is complicated by the increasing encroachment of plates in rolling schedules on the continuous mills. With virtually all government programs now carrying DO ratings the sheet situation is rapidly reaching the stage where producers are unable to give civilian consumers any assurance with respect to supplies. May quotas on regular commercial account are being cut back. One important producer is not setting up any commercial quotas at all for that month.

Cincinnati—District mills foresee no check in the trend toward tighter supplies of sheets for civilian needs. Certainly more tonnage will not be forthcoming as a result of a cutback in durable goods.

Chicago—Already the tightest item in the flat-rolled line, hot-rolled carbon sheets now become even more complicated through new NPA directives. Producers are now engaged in reworking their schedules to ascertain their position in view of upping of the DO percentages from 17 to 25 effective in May. Prior to this action May 1952 was the first month some could book additional DO tonnage. Complicating the picture is the fact that another 5 per cent of continuous hot mill capacity must be allocated to output of light plates.

St. Louis—Cold-rolled sheet supplies are to grow scarcer under Washington's proposal to hike this district's production of plates. Indications are the hike will be 3 per cent more, bringing total plate allotment to 10 per cent of capacity here.

San Francisco—Telephone calls, telegrams and letters—some from as far as New York—are being received by fabricators in this area, offering sizable tonnages of foreign sheets for as much as 20.00c a pound, for southern California ports. Fabricators call this a "red" market instead of a "black" market and attribute the offers to "fly-by-nighters" in the import business.

Semifinished Steel . . .

Semifinished Prices, Page 130

Pittsburgh—Production of rerolling semifinished steel was struck a stiff blow in this district last week by the closing down of production facilities at local plants of the Jones & Laughlin Steel Corp. due to a railroad labor dispute. Something like 6000 tons of ingots were lost daily by the J. & L. shutdown and the situation was so serious in its implications for vital steel supplies, the Army was reported closely watching developments in the labor negotiations. Ingot operations in the district were off 12.5 points to 88.7 per cent of capacity due to the strike. At still another producing point in the area a current minor labor dispute may adversely affect steel production in coming weeks though it has not had any immediate effect. This concerns a dispute of bricklayers at the Homestead Works of United States Steel Co. Unless the strike is ended quickly furnace repairs will be delayed to the point vital steel production eventually may be lost.

Steel Bars . . .

Bar Prices, Page 131

Cleveland—Upping of the DO set-aside tonnage on hot-rolled bars to 20 per cent from 15 will cut just that much more into the short supplies available to regular commercial accounts. Stainless hot-rolled bar set-aside was increased to 50 from 25 per cent, as was the stainless cold-finished set-aside. However, DO tonnage on cold-finished carbon bars holds unchanged at 25 per cent.

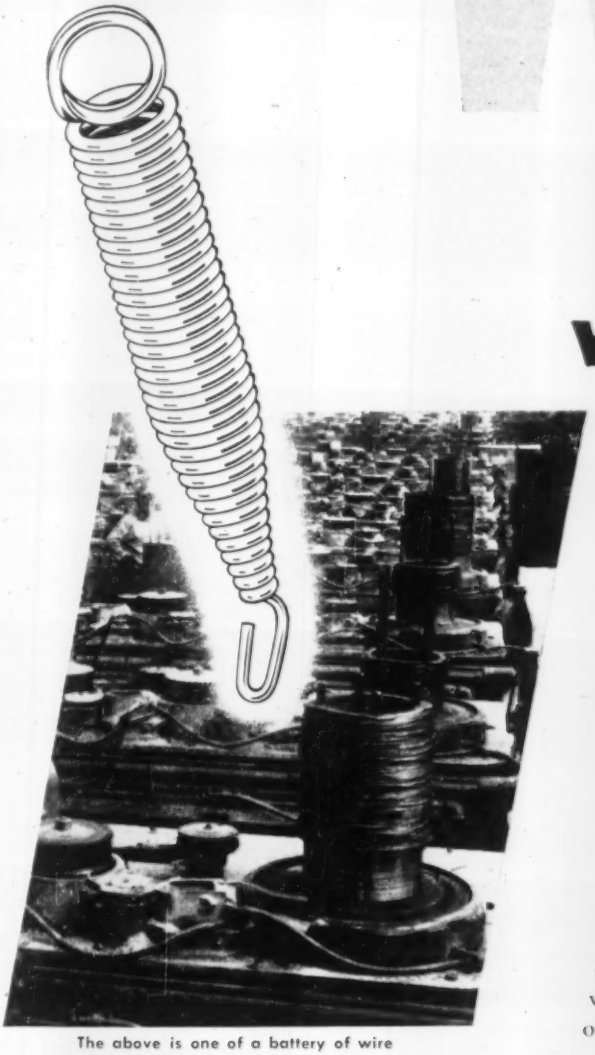
Boston—Bad news for May is out, notably for unrated alloy bar consumers. Carbon bar allocations are lower and an increase in bar demand under MRO is developing to further tighten supply for civilian requirements. Increase in defense reservations on hot-rolled are soon reflected in cold finished and specialty grades. Inland Steel Co. booked 5000 tons of carbon bars for remelting from Watertown, Mass., arsenal.

New York—While no change was announced in DO quotas on cold drawn carbon bars which continue at 25 per cent, hot rolled carbon bars have been advanced from 15 to 20 per cent; and hot rolled stainless bars and cold-finished stainless bars from 25 to 50 per cent.

Philadelphia—The increase of 100 per cent in mill quotas for DO-rated stainless bar tonnage, from 25 to 50 per cent, reflects fast expanding needs of the aircraft industry. Under former quotas, delivery promises had become so extended as to be of little help in various cases.

Pittsburgh—Gradual expansion in the military take is forcing the bar mills to further reduce allotments on regular commercial account. May quotas will be down noticeably from those set up in April because of the heavy rated programs scheduled for

HARD DRAWN MB SPRING



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May as well as increased DO requirements. DO set-aside tonnage on hot-rolled carbon bars has been increased to 20 per cent from 15, on stainless hot-rolled bars and on stainless cold-finished to 50 from 25.

Currently pressure of demand is particularly strong in alloy bars, supply conditions being complicated by the shortage of alloying elements. Also, scrap shortage is hampering production in some areas.

Seattle—Rolling mills are attempting to reduce backlogs and speed deliveries. Demand for small bar tonnages continues active. Reinforcing furnishes bulk of current business. Plants are booked to capacity until the late summer.

Plates . . .

Plate Prices, Page 131

New York—Most allocation programs are now being placed on a DO-rated basis. About the only important program that has'nt been switched over at the time this report is being written is the car program, and some look for that to be affected similarly in the immediate future.

Boston—Part of contracts for 70 welded barges awarded by the Navy are to district shops, including four to James Russell Engineering Works, Boston, taking 500 tons. Production at plate mills totals 50-60 per cent directed and rated volume with May allocations for commercial requirements reduced materially. Included are power plant needs for May and June. Increase in set-aside percentage for rated orders to 25 per cent has not moved much volume forward with some mills booked on DO orders into August.

Philadelphia—Pending interpretation as to application of DO-ratings, most plate mills are planning to run off May schedules on programmed work as originally set up. However, there is much confusion and some mills are not certain as to what policy they may finally follow. Nonrated consumers will receive far less tonnage than in the preceding month.

Expansion in production of strip plate to 5 per cent of monthly average of strip mill shipments in first eight months of last year will provide some relief.

Pittsburgh—Heavier plate needs for the defense program will hit the market in May resulting in an increase in continuous mill plate production at the expense of sheets. Extent of the increased plate load is difficult to determine in the present confused picture but under latest National Production Authority regulations sheetmakers must set aside for plates on DO account an amount equal to 5 per cent of their average monthly shipments of hot-rolled sheets in the base period Jan. 1 through August, 1950. Several additional allocations are scheduled for May and a large part of this tonnage will be drawn from the continuous mills. Meanwhile, the carbon and alloy plate set-asides for DO orders are upped to 25 per cent from 20, and stainless plates to 50 per cent from 25.

Cleveland—Continuous sheet mills must devote more rolling time to production of plates under National Production Authority's latest orders. With more essential defense programs being allocated tonnage and with virtually all government programs now carrying DO ratings the conventional plate mills are unable to take care of demands. Set-aside plate tonnage for DO orders has been increased to 25 per cent from 20, and at the same time hot-rolled sheet producers must set aside for plates an amount equal to 5 per cent of their average monthly shipments of sheets in the first nine months of last year.

Chicago—Nonrated users of plates will experience appreciable shrinkage starting in May as result of two recent NPA directives. In February the agency announced effective May 1 minimum DO order quotas would be boosted from 15 to 20 per cent, then a week ago the figure was adjusted upward again to 25 per cent. This earmarking of more tonnage for direct defense plus the several support programs which call for substantial set-asides for plates reduces the tonnage which mills will have for civilian customers.

Birmingham—Plates are at a premium. Ordinarily deficient capacity is even more in evidence since freight car building is given preference, shipbuilding and repair demands have picked up, and the overall need for plates grows constantly.

Seattle—Plate shops will have to close soon due to depletion of inventories unless new supplies can be obtained on DO ratings. No major projects are pending.

Wire . . .

Wire Prices, Page 133

Chicago—Wire rods are in notably tight supply from the great pressure of nonintegrated wire mills. Of the finished items, high carbon wire and heading stock are extremely short. Similar situation exists in baling wire as jobbers push to build up stocks in anticipation of heavy calls from farmers this summer. For the finer sizes of wire and small and large sizes of hot-rolled rods DO percentage set-asides are completely filled for second quarter. The tremendous volume of construction work accounts for the heavy demand for the heavier sizes of rods.

New York—Larger reservations for defense have reduced sharply the volume of alloy and stainless wire for civilian use. Reservation limit for alloy rods has been raised to 45 per cent from 25, while half of drawn stainless wire is earmarked for rated requirements. Carbon rod DO limit is increased to 20 per cent from 15. More rated orders are appearing for carbon, notably in higher carbon ranges, and some mills are booked well into second quarter on defense.

Pittsburgh—Military requirements for wire and wire products are increasing steadily, as reflected in the increase in set-aside tonnage for DO orders. National Production Authority's latest revision ups the set-aside on carbon wire rods to 20 per cent from 15, on alloy wire rods to 45 from 25, on nails and barbed wire to 10 from 5, and on stainless drawn wire to 50 per cent from 25.

Birmingham—Demand for wire products, accentuated by mild weather, is far greater than supply. Agricultural wire, particularly, is on the short side.

San Francisco—Wire rope is fairly easily available, although one sales organization, representing a big eastern producer, reports its mill is on allocations and is only taking orders for midsummer delivery. Tonnages for rush or emergency jobs, however, are being supplied.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 131

Cleveland—Reinforcing steel is in such tight supply "gray" market operators are having little difficulty disposing of tonnage here at prices considerably above the standard market level. One lot of gray market bars, involving 85 tons, is reported to have been sold here recently at $175 per ton. This compares with the standard price of about $100.

Los Angeles—Despite unprecedented demand, fabricators report plain bar supplies adequate. California state public works officials fear that without priorities the $120 million freeway building construction program may halt. First project to be affected would be a $4 million bridge in Pasadena, to be ready for bids in April.

Tubular Goods . . .

Tubular Goods Prices, Page 134

Pittsburgh—Pipemakers are preparing to adjust schedules to permit accommodation of new government allocations for the petroleum industry. Beginning Apr. 1 the industry will get 157,000 tons of steel casing, tubing and drill pipe, sufficient to drill new oil wells at the rate of 43,400 a year. Order M-47 permits well operators to issue DO ratings for maintenance, repair and operating supplies and laboratory equipment. Also, beginning Apr. 1 well operators can use DO ratings for steel casing, tubing and drill pipe for emergency purposes, and, beginning July 1, they can use the rating for supplies needed for normal operating equipment.

Set-aside tonnages for DO orders have been upped by NPA on carbon steel tube rounds to 30 per cent from 15, and on carbon steel mechanical tubing to 25 per cent from 15. Set-asides on stainless tube rounds, mechanical and pressure tubing have been increased to 50 per cent from 25.

Boston—Merchant steel pipe allocations for May to distributors approximate April tonnage but reductions are indicated for June. Directives for boiler tubes for reactivation of steam locomotives have extended deliveries on more merchanical and pressure tubing sizes. Relatively heavier volume of rated orders are in for tubing than for steel pipe. Inquiry is heavier for power plant piping.

Chicago—The new NPA directives tighten up the pipe and tubing outlook considerably. One action channels specific tonnages monthly to oil and gas well drilling starting in April, and the other specifies that producers earmark 10 per cent to DO requirements beginning in May. This burden imposed on top of demands from the

...ht car and great lakes ship pro... serves notice to civilian con... that cuts in their quotas are to be expected from this point on.

San Francisco—An expected lull in demand for standard pipe has not developed.

Seattle—Unfavorable weather has adversely affected the cast iron pipe demand, but considerable tonnage is expected to be up for bids soon. Agencies find increasing competition from other types of pipe.

Tin Plate . . .

Tin Plate Prices, Page 132

Pittsburgh—Tin plate makers are uncertain just how the National Production Authority's order designating the RFC as sole importer of tin from here on is going to work out. Last week they were reluctant to express their views pending thorough digesting of the government's order. At any rate, beginning May 1, the NPA plans to completely allocate tin to domestic users.

Provisions of the NPA container order have been adjusted so that canners of food and other products can increase their pack in certain instances. This means an increase in the permissible use of tin in second quarter, tin plate makers being permitted in each month of the period to use up to 95 per cent of their average monthly use of pig tin in the first half of last year. During February and March use was restricted to 80 per cent.

The new tin order, amendment 3 to M-8, does not change the specifications for tin cans for different products as announced in January, but it is understood modifications of the list that can use cans for food packing are under study. It is indicated these modifications would likely reduce further the amount of tin that canners of certain food products will be permitted to use in second quarter to partially offset the increased tin use permitted for more perishable and essential foods.

Structural Shapes . . .

Structural Shape Prices, Page 131

Boston—Booked well beyond production limitations on both light and heavy structural shapes, directive volume approximating 30 per cent, shape producers are accepting new rated tonnage more conservatively. Some projects under contract average close to one month behind schedule.

New York—Power plant construction continues to expand, with several projects either being placed or figured. Demand otherwise is quiet, due to uncertainty as to when steel will be available for various types of civilian work and also to the fact that most fabricators are booked so far ahead.

Cleveland—Regulations restricting certain types of building construction have not substantially eased pressure for structurals and other classes of building steel. Fabricators report they are turning down numerous jobs coming to them because of inability to obtain steel. This scarcity of plain material is restricting fabricating operations and there isn't any likelihood of a change for the better soon. Some "gray market" structurals are reported coming into this area at prices that figure out around 8.75c f.o.b. eastern points. This compares with the Cleveland warehouse price of 5.82c, and a Pittsburgh district mill price of 3.65c.

Philadelphia—Structural activity is slacking not only in work definitely banned by Washington but in demand for much of the usual commercial construction. Fabricating shops are booked well into the future, with steel supply constantly tightening.

Seattle—Fabricators' demand for small quantities of shapes for industrial construction is strong, public works furnishing the larger jobs.

Manganese Ore . . .

New York—Importers of manganese ore complain of ever increasing ocean freight rates. Rates from India and the west coast of South Africa are around $16-$17 a ton compared with $10-$11 a year ago.

Export-Import Bank, Washington, authorized negotiation of a $30 million credit for the production of manganese ore in western Brazil. An ore deposit would be developed by a corporation in which United States Steel Corp. has a 49 per cent interest and Brazilian interests 51 per cent.

Pig Iron . . .

Pig Iron Prices, Page 130

Cleveland—Struggling with a shortage of pig iron, the foundries in this district somehow manage to maintain operations at high level. Most shops are on a 5-day per week schedule, but a number have been able to go to six days. More would go to the longer week were iron and coke in sufficient supply to assure maintenance of schedules. No respite in the acute iron supply situation is in early prospect with merchant furnace output fully committed. Increasing talk is heard in the market of resort to allocations but informed opinion here is that such distribution policy is unlikely to be effected by the government until a Controlled Materials Plan is ready for adoption. Even then pig iron may not be included in the plan, it is said. Eight out of 9 blast furnaces in this immediate district continue in operation.

Boston—Although most foundries have lowered the ratio of pig iron in melts, many could go lower. Thus far balance is adjusted to iron supply, holding relatively steady with the district furnace. Minimum of iron is moving in from other districts. One steelworks is operating high on scrap. Malleable in wanted analyses is difficult at times resulting in further changes in mixtures.

New York—Pig iron supply shrinks, but most consumers here are able to maintain at least 5-day week operations by drawing more heavily upon scrap and ferroalloys.

Buffalo—Lake navigation got off to the earliest start on record here when the steamer *Perseus* of the Nicholson Transit Co. left the harbor on Mar. 14 with 7000 tons of pig iron destined for Detroit. Merchant pig iron market continues tight despite slow expansion in government work. Foundries are pressing for supplies but no curtailment in melting operations is noted because of inadequate shipments.

Philadelphia—Most basic iron consumers have been able to get along with such supply as is available and, of course, those who have their own blast furnaces see to it that their needs are met. However, the foundries in this district find the going increasingly rugged and increasingly are appealing to Washington for help. A cargo of 6000 tons of Chilean iron is expected here mostly for open hearth use. European shipments of pig iron are coming through slowly.

Pittsburgh—Merchant pig iron sellers see no prospect for any substantial change in supply conditions before summer. With the foundries in receipt of an increasing volume of military and other emergency orders pressure for iron deliveries mounts. The situation also is aggravated by a growing shortage of scrap. Pig iron producers are distributing available tonnage as equitably as possible with the result no foundry shutdowns for lack of iron have been reported. However, expansion of the foundry melt is being hampered and pressure for allocations is increasing. Expectations are resort to government allocations will be deferred until conditions get much worse than they are at present. The trade here thinks the government control agency will not act until it is ready to put a Controlled Materials Plan into effect, probably in July. Railroad labor difficulties at the local works of the Jones & Laughlin Steel Corp. last week forced a reduction in district blast furnace operations. At midweek there were only 39 out of 47 stacks in the district active, down six from the previous week.

Cincinnati—Trimming of allocations of northern iron to melters in this district has caused a shift by some foundries to reliance on foreign iron, laid down as high as $87. Most melters also are relying heavily on scrap. Few are depending on DO ratings, and there is some discussion of allocations as a means of bringing in adequate tonnage for the machine tool industry in this district.

Birmingham—Merchant iron melters report demand strong and pressure for deliveries increasing.

Los Angeles—Foundries, at capacity operations, are encountering difficulty in obtaining enough pig iron to satisfy heavier melting rates.

Iron Ore . . .

Iron Ore Prices, Page 135

Birmingham—A bulk-handling conveyor system to provide additional ore-handling facilities for the Alabama state docks and terminals in Mobile, Ala., is being installed by Rust Engineering Co., Pittsburgh, at cost of $750,000. Incoming ore will be received from the unloading towers by the new system of conveyors and transferred to a shipping-out bin or to bulk storage.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 130

Cleveland—Despite the shortage of oven coke in this district foundry operations are sustained at high level. The outlook is not promising, however, with shortage conditions accentuated by the closing down of the Erie ovens for repairs. There is no excess by-product oven capacity to offset this loss in production in this general area. Increased resort to beehive coke is seen as the only out for consumers in the present stringency.

Scrap . . .

Scrap Prices, Page 140

Pittsburgh—What appears to be a serious shortage of scrap is shaping up. Local yards are pretty well cleared of material and the little tonnage coming in to them is reported moving out quickly to foundries and steel mills. High-level steelmaking operations are taking toll of the moderate stockpiles held by the mills. These inventories are said to range from 30 to 45 days. However, apprehension prevails for the late months of the year when substantial additions to steelmaking capacity are scheduled to come into operation, placing an additional burden on the meager scrap supply. As a result, pressure for government allocations is increasing and it will surprise no one if such action is taken shortly. Some changes in the government's ceiling price regulations are expected but so far no action has been taken by the stabilization authorities on the various requests for removal of certain "bugs" which have come to light in the regulations since they were made effective Feb. 7.

Detroit—Trading is snafu-ed by the two price levels existing on steel scrap. Dealers hesitate to make any sales until the situation is clarified. If the $40.20 shipping point level, which is arrived at by using the Cleveland base less water rates and dock charges, is to be officially established they don't want to sell their scrap now at the $39.05 official price. Meantime they don't want to risk the possibility of law-breaking by selling at the higher price. Quick action by OPS to settle the problem once and for all is urged. Cast scrap has virtually disappeared from trading, apparently due to a shortage. Inventories are comfortable at only a few foundries.

Buffalo—Steel mills here are encouraged by the early opening of lake navigation as a heavy movement of scrap is slated to arrive here from upper lake ports. Heavy inroads have been made by the mills on reserve stocks. Only a negligible improvement is noted by dealers in the slow trickle of scrap into their yards.

Youngstown—Steel plants here are suffering from an acute scrap shortage which actually has cut operations at Copperweld Steel Co.'s mill at Warren, O. Other mills have not had to cut down operations, but they are having a nip and tuck battle getting enough to keep going. The situation is getting worse.

Chicago—Fact that some dealer scrap originating in this district is being allocated to the Valley indicates the overall situation is not as tight here as elsewhere. Nevertheless all classes of consumers seek more material than suppliers are willing to contract for under unfavorable supply conditions. Cast material appears nonexistent in required amounts and foundries are forced to pay $1o or more to bring in tonnages from remote points.

Philadelphia—Scrap supply continues tight, with some up-grading reported, especially in cast. However, importations are coming in a little more freely this month. One large eastern consumer has five cargoes of German scrap scheduled for arrival in March. One has already arrived and another is nearing port. The cargoes will average about 6000 tons apiece.

Boston—Consumers of No. 1 heavy melting steel are operating with small inventory while users of cast claim some upgrading. Little or no tonnage has been allocated in this area. Some premium grades at $5 per ton over No. 1 heavy melting steel, or $39.17, shipping point, have been bought for open hearths.

New York—As considerable upgrading of scrap is reported, some trade interests believe it will be necessary for the government to revise certain prices in order to check this practice. Meanwhile, scrap is flowing a shade more freely, although supply is still very tight.

Cleveland—Interests in the scrap trade are disappointed that the government has delayed issuing an amendment to its price schedule No. 5. Clarification is needed to facilitate trading and to eliminate some of the inequities which were apparent soon after the order was made effective Feb. 7. Mills are operating on a hand-to-mouth basis, but so far have been able to maintain production close to capacity. Foundries need more scrap and are unable to obtain required tonnages.

Cincinnati—Allocations of iron and steel scrap are appearing in this district for a few spots where open hearth and foundry supplies are critically low. Some melters are fairly well stocked. Shipments are better, but under seasonal normal.

St. Louis—Scrap trading has slowed further pending pricing amendments from Washington. Foundries are pressing for metal but weather hampers shipments. Railroads are beginning to prepare scrap which formerly sold as mixed or unassorted to take advantage of the price differential. Among those now listing specific grades are the Union Pacific, which normally markets 1500 to 3000 tons monthly, and the Louisville & Nashville, which averages less than 1000 tons.

Birmingham—Cast grades of scrap are scarce. Buying has assumed more normal proportions and a somewhat heavier movement into the district is reported due to abnormally warm weather.

San Francisco—Where to unearth enough scrap to keep the steel mills going indefinitely at their present full blast? Unless it is answered, steel producers face a day of reckoning as most of them are dipping into their inventories to maintain current schedules.

Seattle—Stormy weather handicapped scrap collections last week with shipments smaller than usual. Inventories are practically gone, mills are operating on a day-to-day basis. The largest buyer is paying top prices to the railroads. This material heretofore has gone out of the area.

Warehouse . . .

Warehouse Prices, Page 135

Cleveland—Local warehouse stocks continue to shrink though some distributors note a slight improvement in shipments from the mills. Demand is strong from all directions and involves far greater tonnages than can be promptly satisfied. Sellers are distributing available supplies to customers in such fashion widespread curtailments of small manufacturing plant operations for lack of steel have been averted to date. Warehouse inventories in this area currently average only about half the tonnage held at this time a year ago. Distributors anticipate a change in NPA order M-6 which may materially improve their standing with the mills. Proposed revision, it is understood, assures the warehouses 85 per cent of quotas based on their receipts in the first nine months of 1950.

Philadelphia—Warehouses report a sharp stepping up in DO-rated orders for maintenance and repairs. Latest increase in the mills' quotas for such tonnages is designed to ease promises in general, but some question exists if it will much more than keep pace with expanding rated requirements.

Pittsburgh—With rated orders on the mills increasing, local steel distributors do not anticipate much, if any, relief in their current supply difficulties. Shipments have been coming in steadily from the mills but they are irregular and total tonnage, while fairly substantial, falls below customers' requirements. Low and unbalanced stocks restrict warehouse sales to a volume which has been running fairly constant for some time past.

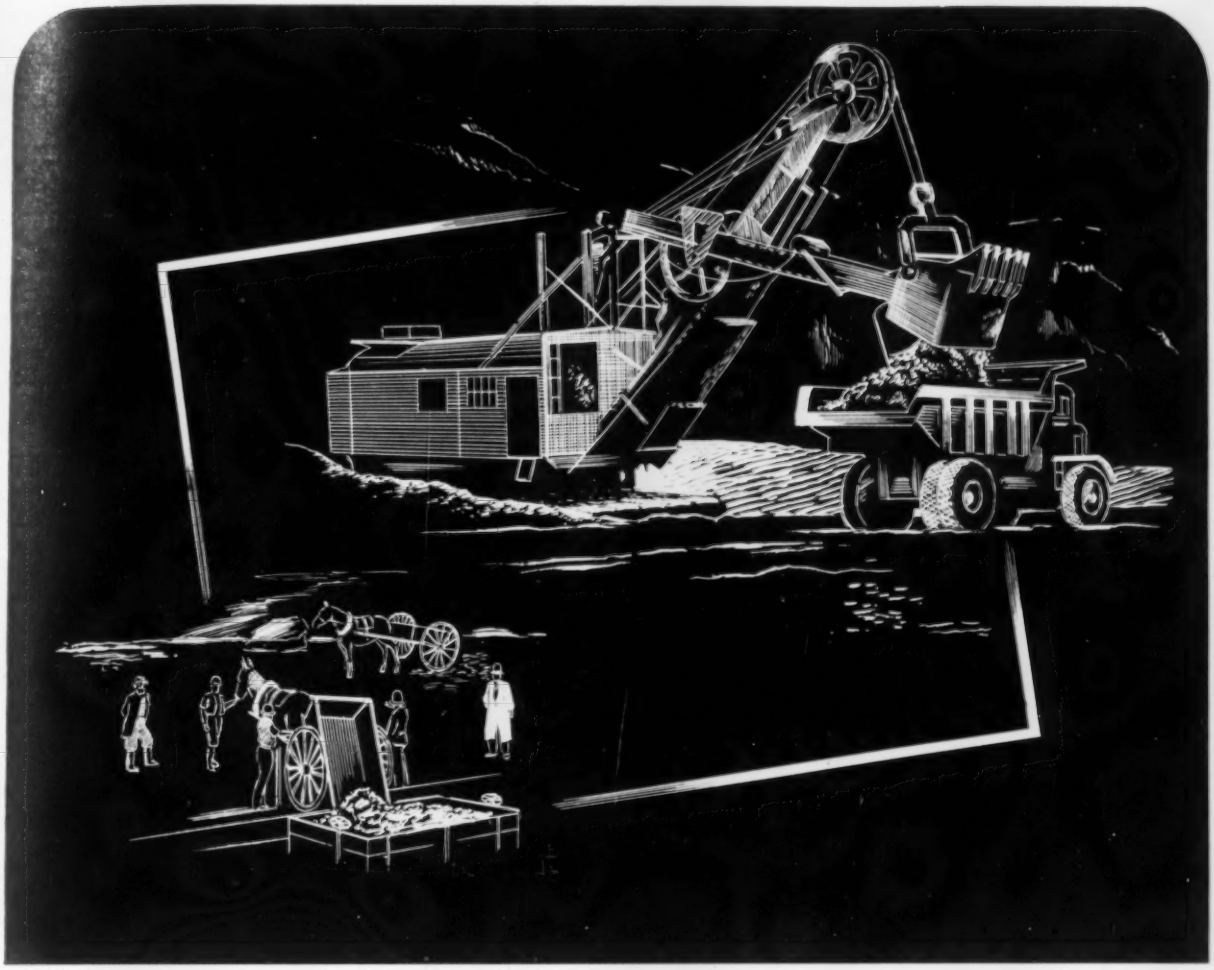
Cincinnati—Warehouse stocks are in poor condition to meet any seasonal upswing in building activities. Short angles are available but the supply of beams is light in face of an increasing inquiry. Cold-finished bars, sheets and plates are not coming in fast enough to ease the fabricators' situation.

Chicago—In no product are warehouses able to satisfy demands and they lose ground month by month under their mill quotas. Expectation is that NPA will before long make revisions in the formula or method of providing steel to warehouses.

Birmingham—While short, warehouse steel stocks generally are expected to show some slight improvement. Shipments remain approximately on the basis of January tonnage.

Los Angeles—DO backlog of one district warehouse is 7 per cent of total orders.

San Francisco—A peculiarity of the present hectic steel market may be developing in the distributors' end of the business. Although faced with one of the greatest periods of demand in history, warehouses likely



SINCE 1850

THE IRON ORE INDUSTRY

has kept pace with the demands of science and industry in the production of ferrous metal. Through four great wars and through the greatest century of mechanical development in the history of mankind it has met and satisfied every demand that has been made upon it.

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will book a smaller volume of business in the second quarter than in the first three months. The reason: They cannot get the steel to fill their customers' demands.

Seattle—Warehouse steel supply is increasingly critical with inventories at a record low.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6500 tons, piles, supply officer, yards and docks, Port Hueneme, Calif., to Bethlehem Steel Export Co., New York.

6000 tons, generator building addition, East Pittsburgh Works, Westinghouse Electric Corp., to Bethlehem Steel Co.; Stone & Webster Engineering Corp., Boston, contractor-engineer.

1800 tons, government power house, Fort Richardson, Alaska, to Isaacson Iron Works, Seattle; Patti-MacDonald Co. general contractor.

1800 tons, shelter shed, Pennsylvania station, Pittsburgh, to American Bridge Co., that city.

750 tons, factory building, Rheem Mfg. Co., Linden, N. J., to Harris Structural Steel Co., New York.

700 tons, power plant, Long Island Lighting Co., Far Rockaway, N. Y., to Harris Structural Steel Co., New York.

225 tons, Missouri River Basin project, Canyon Ferry, Louisville, Mont., to Virginia Bridge Co., Denver.

200 tons, nurses home, St. Mary's Hospital, Bridgeport, Conn., to Topper & Griggs, Hartford, Conn.; E & F Construction Co., Bridgeport, general contractor.

175 tons, school building, Framingham, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Franklin Construction Co., Medford, Mass., general contractor.

160 tons, telephone building extension, Asbury Park, N. J., to Park Steel Co., that city.

100 tons, shapes and bars, Chase School, Waterbury, Conn., to Topper & Griggs, Hartford, Conn.; Waterbury Construction Co., Waterbury, general contractor.

100 tons, Missouri River Basin project, Keyhole unit, Moorcraft, Wyo., to Virginia Bridge Co., Denver.

100 tons, McNary dam warehouse to unstated interest; King Construction Co., Vancouver, Wash., general contractor.

100 tons or more, miscellaneous steel, Richland, Wash., to General Iron Works, Kennewick, Wash.

STRUCTURAL STEEL PENDING

7000 tons, Charlestown section, single and double deck elevated highway, Boston central artery, Boston; bids postponed to Apr. 3.

2000 tons, state bridge, Charleston, Mass., opening of bids postponed to Apr. 3.

4250 tons, superstructure, continuous multi-span steel truss bridge, Merrimac river, Newburyport-Amesbury, Mass.; bids Apr. 10, Boston.

2000 tons, state bridge, over Merrimac river, Amesbury and Newburyport, Mass., bids Apr. 3.

1500 tons, Ross dam power house; Guy F. Atkinson Co., Seattle, apparently, low to Seattle Light Department.

420 tons, state bridge, Ocean county, New Jersey; Ole Hansen & Sons, Pleasantville, N. J., awarded general contract.

170 tons, Pennsylvania railroad bridge, Forest, O.; bids Mar. 20.

145 tons, shapes and bars, rolled beam bridge, Newton, Conn.; bids Mar. 26, Hartford, Conn.

135 tons, shapes and bars, two bridges, Dalton-Windsor, Mass.

130 tons, Reading Co. bridge, Allenwood, Pa.; bids in.

Unstated, second stage Albeni dam, Idaho; general contract to Donovan-James Construction Co., Seattle, low $3,839,148 by U. S. Engineer.

Unstated, three schedules, structures and utilities, Richland project; Sound Construction & Engineering Co., Seattle, low $2,646,569, to U. S. Engineer, Seattle.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, American Gas & Electric Co., Beverly, O., to Builders Structural Steel Co., Cleveland.

600 tons, caisson work, Detroit, to C. J. Glasgow, that city.

200 tons, Washington state bridge, Spokane telephone building and radar station, to Bethlehem Pacific Steel Corp., Seattle.

150 tons, highway project, Akron, to United States Steel Supply Co., Chicago.

105 tons, generator building addition, East Pittsburgh, to Concrete Steel Co., Boston; Stone & Webster Engineering Corp., Boston, contractor-engineer.

100 tons, parochial school and convent, Milford, Mass., to Tucker & Fox Co., Boston; Granger Construction Co., Worcester, Mass., general contractor. Shapes were awarded to American Architectural Iron Co., Boston.

100 tons, school, Framingham, Mass., to Bethlehem Steel Co.; Franklin Construction Co., Medford, Mass., general contractor.

70 tons, nurses homes, St. Mary's Hospital, Bridgeport, Conn., to Topper & Griggs, Hartford, Conn.; E & F Construction Co., Bridgeport, general contractor.

REINFORCING BARS PENDING

3750 tons, Seattle's Ross dam powerhouse project; Guy F. Atkinson Co., Seattle, apparently low $14,690,000.

1200 tons, expansion, National Cash Register Co., Dayton, O.

500 tons, Wisconsin-Michigan Power Co., Iron Mountain, Mich.

470 tons, sewage treatment plant, Fostoria, O.

470 tons, building, Minnesota Mining & Mfg. Co., Chicago.

360 tons, bridge superstructure, Merrimac river, Newburyport-Amesbury, Mass.; bids Apr. 10, Boston.

135 tons, building, Torrington Co., South Bend, Ind.

130 tons, elementary school, 4640 S. Lamon Ave., Chicago.

Unstated, officers' quarters, Elmendorf and Ladd air fields, Alaska; J. C. Boespflug Construction Co., Seattle, low $3,491,575 to U. S. Engineer, Seattle.

PLATES . . .

PLATES PLACED

4905 tons, four contracts, hull plates, Navy purchasing office, Washington, to United States Steel Co., Washington.

1400 tons, two contracts, hull plates, Navy purchasing office, Washington, to Bethlehem Steel Co.

PLATES PENDING

100 tons, or more, third stage McNary dam construction; bids to U. S. Engineer, Walla Walla, Wash., April 5.

Unstated, four oil storage tanks; bids to Bonneville Power Administration, Portland, Oreg., Mar. 23.

PIPE . . .

CAST IRON PIPE PLACED

700 tons, various sizes, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J., by Portland, Oreg.

80 tons, 2000 feet 12 inch, to Pacific States C. I. Pipe Co., Provo, Utah, by Portland, Oreg.

CAST IRON PIPE PENDING

Unstated, 9700 feet 6 and 4 inch, also alternatives; bids to District No. 42, Alderwood Manor, Wash., Mar. 12.

STEEL PIPE PLACED

3620 tons, wrought iron pipe, Navy purchasing officer, Washington, to A. M. Byers Co., Pittsburgh.

STEEL PIPE PENDING

Unstated, 30,500 feet 8 to 4 inch; bids to Marjorie A. Miller, city clerk, Kennewick, Wash., Mar. 20.

Unstated, 46,000 feet 10 inch and smaller, 73 gates and other items, District No. 43, King county, Washington; bids to Parker, Hill & Ingman, engineers, Seattle, Mar. 20.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Akron & Barberton, one 1200-hp diesel-electric switching unit, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

Canadian National, twelve 800-hp diesel-electric switching locomotives to General Motors Diesel Ltd., London, Ont.; twelve 660-hp units, to Montreal Locomotive Works, Montreal, Ont.

Kansas City Southern, four 1200-hp diesel-electric switching locomotives, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

Louisville & Nashville, 67 diesel-electric locomotive units, to Electro Motive Division, General Motors Corp., La Grange, Ill. The group comprises thirty-one 1500-hp freight, twelve 1500-hp freight type "B"; ten 1500-hp road, ten 1200-hp switching and four 1500-hp general purpose units.

Wabash, two 1200-hp diesel-electric engines to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

LOCOMOTIVES PENDING

Rock Island, 46 diesel locomotives, to cost more than $7 million. Inquiry includes six 2250-hp road passenger units, fifteen 1500-hp double-control suburban units, and twenty-five 1500-hp general purpose diesels.

RAILROAD CARS PLACED

Illinois Terminal, 25 seventy-ton mill type gondola cars, to Greenville Steel Car Co., Greenville, Pa.

New York Central, 2500 freight cars: 1000 seventy-ton gondolas, to Greenville Steel Car Co., Greenville, Pa.; 1000 seventy-ton gondolas for Central's subsidiary, Pittsburgh & Lake Erie, to Bethlehem Steel Co.; 500 seventy-ton flat cars to General American Transportation Co., Chicago.

Lake Superior & Ishpeming, 300 seventy-ton ore cars, to Bethlehem Steel Co., and 100 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Louisville & Nashville, 100 seventy-ton covered hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

Minneapolis, Northfield & Southern, 100 seventy-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Cudahy Packing Co., 50 forty-ton refrigerator cars, to own shops.

Northern Pacific, 1000 box cars, 200 seventy-ton ore cars and 50 caboose cars, to own shops at Brainard, Minn.

American Refrigerator Transit Co., 500 refrigerator cars, to Pressed Steel Car Co., Chicago.

RAILROAD CARS PENDING

Western Maryland, 1000 fifty-five-ton hopper cars; bids asked.

FERROALLOYS

(Continued from page 135)

4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

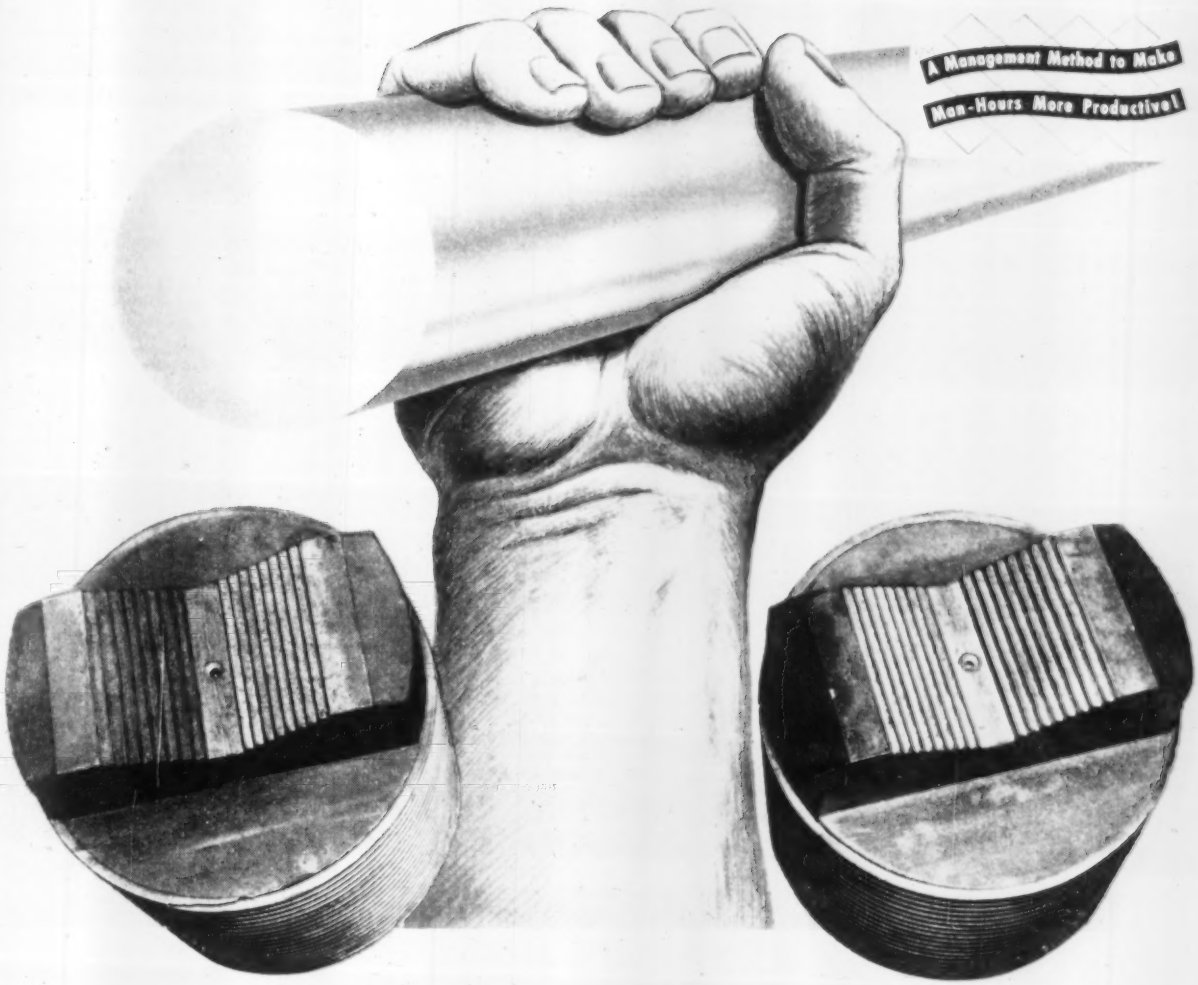
Low-Carbon Ferrochrome: (Cr 67-72%.) Contract, carload, lump, bulk, max. 0.03% C 33.60c per lb of contained Cr, 0.04% C 31.50c, 0.06% C 30.50c, 0.10% C 30.00c, 0.15% C 29.75c, 0.20% C 29.50c, 0.50% C 29.25c, 1% C 29.00c, 1.50% C 28.85c, 2% C 28.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N.; add 5c for each 0.25% of N above 0.75%.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 23.25c per lb of contained Cr, c.l., packed 24.15c, ton 25.50c, less ton 27.25c. Delivered Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract Carload, packed, S MxD, 16.35c per lb of alloy; ton lot 17.2c; less ton lot, 18.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload lump, 4" x down and 2" x down, bulk, 21.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 21.90c per pound of contained chromium plus



You Can Tighten Your Grip on Production with This Method

These giant jaws, made from Vega (Air-Tough) Tool Steel, grip 13½" round steel billets during rough turning in the largest machine of its type. Steady, uninterrupted production in the operation depended largely on quickly finding the right tool steel.

The company had been using an oil-hardening steel for jaws in normal-sized machines. But when the new giant came along it was a different story. Now a steel was needed that would harden uniformly, and *through very heavy sections*. By using the Carpenter Matched Set Method, the company was right the first time in selecting Vega . . . and saved costly experimenting with different tool steels. More important, production management was able to put the jaws in operation, knowing they could depend upon heavy production schedules being maintained.

This workable Method offers your plant more advantages than accurate, simplified tool steel selection. It can help you make machine operators more productive. It can do a lot to make heat treating a "routine", trouble-free procedure. It can hold your tool steel inventories to a minimum. Find out how, why and where it can work for you. Write for the new booklet "How to Get Better Tool and Die Performance". THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

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Carpenter

MATCHED TOOL & DIE STEELS

More than top-grade steels . . . a Method to keep tooling and production on schedule!

For your convenience, Carpenter carries warehouse stocks in principal cities throughout the country

12.60c per pound of contained silicon. F.o.b. plant, freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 36-39%, Al 7-9%, C 0.05% max.) 21.75c per lb of contained silicon plus 12.4c per lb of contained silicon plus aluminum, 3" x down, delivered.

Chromium Metal: (Min. 97% Cr and 1% Fe) Contract carload, 1" x D; packed, max 0.50% C grade, $1.08 per lb of contained chromium ton lot $1.10, less ton $1.12. Delivered. Spot add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $3.25 per lb of contained W 2000 lb W to 10,000 lb W, $3.25; less than 2000 lb W, $3.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.) Contract or spot, 1000 lb or more, $4.15 per lb of contained W; less than 1000 lb W, $4.25.

Silicon Alloys

25-30% **Ferrosilicon:** Contract, carload, lump, bulk, 20.00c per lb of contained Si; packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si; carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 15.55c per lb of contained Si, carload packed 16.8c, ton lot 17.5c, less ton 18.95c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.5c per lb of contained Si, carload packed 18.7c, ton lot 19.65c, less ton 20.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 20.0c per lb of Si, c.l. packed 21.2c, ton lot 22.1c, less ton 23.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe.) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton lot 16.0c, less ton 16.9c. Delivered. Add 0.25 for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.55c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si) Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.55c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-[illegible], Si 3.5% max., Si 4% max., C 0.10% max. Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-[illegible], Si 5% max., Si 4% max., C 0.10% max.) Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-[illegible], C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-[illegible], C 2-4.5%). Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $3.10 per lb of contained Va. Delivered, Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.6-1% max.), $3.20. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb. No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Zirconium Alloys

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, delivered; less ton lots $3.80.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb. contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., 95.00c.

NON-FLUID OIL

TRADE MARK REGISTERED

The Drip-less Crane Motor Lubricant

NON-FLUID OIL stops oil showers from overhead cranes. Its exclusive adhesive properties enables it to stay in bearings and off tracks, pillars and products. Thus, NON-FLUID OIL lessens fire hazards, reduces stock cleaning costs, and lowers oil and application costs.

NON-FLUID OIL provides equal advantages for lubrication of all other types of motors. Write for instructive bulletin and free testing sample.

NEW YORK & NEW JERSEY LUBRICANT CO.

292 Madison Ave., New York 17, N. Y. Works: Newark, N. J.

WAREHOUSES: Atlanta, Ga. • Birmingham, Ala. • Charlotte, N. C. • Chicago, Ill. • Columbus, Ga. • Detroit, Mich. • Greensboro, N. C. • Greenville, S. C. • Providence, R. I. • St. Louis, Mo.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

California

Mfg. Co., Huntington Park, Calif., is constructing additional facilities for manufacture of ice cream mixers and automobile accessories.

California

Ward Heater Co., Los Angeles floor furnaces—was bought by **Noma Electric Corp.,** New York. Ward will operate as part of Noma's Estate Heatrola Division.

Connecticut

New Britain Machine Co. has sold its Shop Furniture Division to **Industrial Bench & Equipment Mfg. Co.,** New Britain, Conn. Industrial Bench is housing this division in a new plant and will manufacture and distribute under its own brand name.

Georgia

American Chain & Cable Co. Inc., Bridgeport, Conn., moved its Atlanta office to its building at 1401 Howell Mill Rd. N.W., which also serves as its wire rope warehouse.

Illinois

Granite City Steel Co., Granite City, Ill., will receive bids until Mar. 21 on the construction of an office building addition to cost about $350,000.

Illinois

Ford Motor Co., Dearborn, Mich., purchased a tract of land in Melrose Park, Ill., for construction of a service parts depot. Construction of the building will begin as soon as possible.

Illinois

Harnischfeger Corp., Milwaukee, will construct a plant at Crystal Lake, Ill., for the manufacture of diesel engines having one to six cylinders. Production is scheduled to begin in October.

Illinois

J. J. Tourek Mfg. Co., Chicago, is constructing a screw machine products manufacturing plant at 1901 S. Kilbourn, that city. Estimated cost exceeds $500,000.

Iowa

Riverside Foundry of S & W Corp., Bettendorf, Iowa, has undertaken a $2 million expansion and modernization program which will permit the foundry to produce armor steel castings for tank and mobile fighting equipment. The company expects its defense contracts to reach $20 million a year.

Louisiana

Mexico Refractories Co., Mexico, Mo., appointed Marine & Industrial Service Co., New Orleans, as distributor of its refractories products in that territory. Russell E. Pardee is New Orleans district sales manager for Mexico Refractories.

Maryland

Trio Sheet Metal Co., Baltimore, moved to larger quarters at 5226 Fairlawn Ave., that city.

Maryland

Metal Masters Inc., Baltimore, manufacturer of restaurant equipment and also engaged in general sheet metal work, moved into larger quarters at 1013 E. Fayette St., that city.

Maryland

Cassis Mfg. Co., Baltimore—sheet metal worker—moved to 1226 Cooksie St., that city.

Michigan

National Battery Co., St. Paul, will build a $1 million plant in Monroe, Mich. The plant will produce batteries to fill ordnance contracts.

Michigan

Houdaille-Hershey Corp., Buffalo, sold its entire interest in **Muskegon Motor Specialties Co.,** Muskegon, Mich., to Fred L. Flanders of the latter city. The Muskegon company has a crankshaft plant in Jackson, Mich. Its camshaft plant in Muskegon has been idle for about six months in a dispute with the union over a management proposal to consolidate its operations with those of the Jackson plant.

Minnesota

Cleco Division, **Reed Roller Bit Co.,** Houston, appointed Olson Equipment Co., Minneapolis, as distributor of its pneumatic tools in that territory.

Missouri

Sterling Machinery Corp., Kansas City, Mo.—pumps and hoists—was acquired by **Essick Mfg. Co.,** Los Angeles, manufacturer of air cooling and construction equipment.

Missouri

Washington Metal Products Co., Washington, Mo., award-

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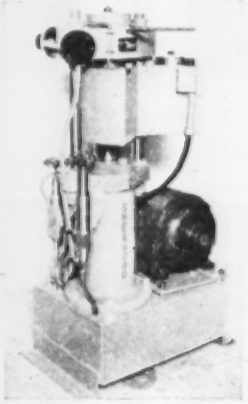

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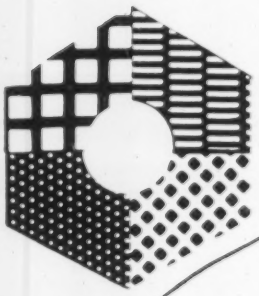

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New Jersey

American-Marietta Co., Chicago—paint—acquired 52.6 per cent of the outstanding common stock of **Metals Disintegrating Co.,** Elizabeth, N. J., a producer of metal powders used in the manufacture of paints, paper coatings and printing inks.

New York

Fairchild Engine & Airplane Corp., Hagerstown, Md., will construct a large plant for its Guided Missiles Division at Wyandanch, New York. The first unit, costing an estimated $1,750,000, is scheduled to be in operation by Sept. 1.

New York

Airborne Instruments Laboratory Inc., Mineola, N. Y., is building a plant at 140 Old Country Rd., that city.

New York

Century Electric Co., St. Louis, moved its branch office from Rochester, N. Y., to Syracuse, N. Y. Lloyd H. Downing is the district sales manager in charge of the Syracuse office.

New York

Cortner Corp., New York, has been appointed agent in this country for Ferrostaal A. G., export affiliate of Gutehoffnungshuette, third largest integrated steel mill in Germany, for its complete line of open-hearth and Thomas rolling mill products.

New York

Utica Drop Forge & Tool Corp., N. Y., will open a tool manufacturing plant in Clinton, N. Y., next month.

New York

Acme Drill Co., Scranton, Pa., plans construction of a $200,000 plant in Buffalo as part of an expansion program. The firm will continue to operate its West Lackawanna avenue plant until the new facility is operating.

New York

Rome Grader Division, **Union Fork & Hoe Co.,** Rome, N. Y., has been purchased by **Pettibone Mulliken Corp.,** Chicago, which will continue the manufacture of earth graders at the Rome factory.

New York

Park Metalware Co. Inc., Orchard Park, N. Y., hand tools—is spending about $100,000 to expand its factory and to buy new equipment. The expansion will enable the firm to double its production.

Ohio

Youngstown Alloy Casting Corp., Youngstown, is embarking on its third expansion program in a little over one year. The concern is spending about $100,000 for a plant addition, electric furnace, sand machine and core oven. The company makes alloy steel castings, such as bar mill and pipe mill guides, for the big steel plants. The company is about eight months behind on deliveries and is working seven days a week.

Ohio

Empire Products Inc. and **Empire Ironer Inc.,** Cincinnati, are constructing a manufacturing plant at Bellevue and Railroad streets, Rossmoyne, O.

Pennsylvania

Johnson Bronze Co., New Castle, Pa., is observing its 50th anniversary. The following new conceptions of bearing materials mark important steps of Johnson's progress in sleeve bearing production: 1901, cast bronze bearings and bronze castings heavily lined with babbitt; 1920, graphited bearings and bronze bearings with thinner babbitt linings; 1924, Johnson bronze thin wall bearing, known as rolled sheet bronze; 1932, babbitt on steel; 1939, Ledaloyl, bronze bearings produced by powder metallurgy; 1942, bronze-on-steel bearings; more recently, aluminum alloy bearings.

Wisconsin

Allis Chalmers Mfg. Co., Milwaukee, appointed TriState Electric Motors Inc., Troy, N. Y., as dealer for its motors, controls, transformers and pumps; Houston Belting & Supply Co., Houston, for controls; and Georgia Electric Co., Albany, Ga., for motors, controls, transformers and Texrope drive equipment.

Canada

Dominion Steel & Coal Corp. Ltd., Sydney, N. S., will expand capacity for production of finished products, reports C. D. Howe, Canadian trade minister. He expects to receive definite proposals from the company soon with regard to enlarged facilities for making rods and wire.

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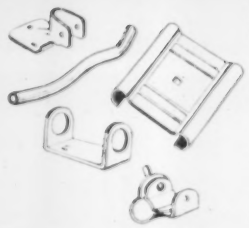

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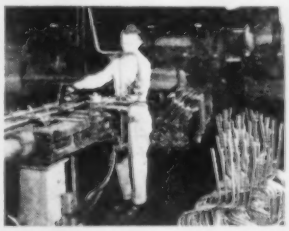

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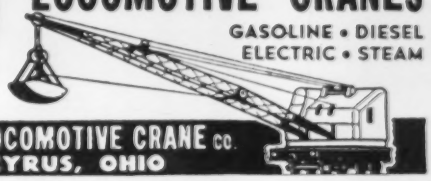

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